

Attachment 3.1 – Supporting Documents

Workplan

Madera Region – IRWM Implementation Grant Application

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Attachment 3.1, Overview of Projects

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Attachment 3.1 – Overview of Projects

I. Overview of Projects

A. Project Summaries

The Madera Region proposal includes four projects. For purposes of consistency with the budget, the overall grant administration is being considered as a fifth project.

Project	Project Proponent	Abstract	Status
A. Grant Administration	Applicant – Root Creek Water District	Compilation of reports and invoices from project proponents and timely submission to DWR as well as oversight to ensure that tasks and timelines are proceeding in accordance with the Grant Agreement.	Applicant will subcontract day-to-day administration activities to Provost and Pritchard; the Applicant already has a contract in place for administrative and technical work.
B. Ash Slough Arundo Eradication and Sand Removal Project	Madera County Resource Management Agency	Eradication of Arundo Donax, an invasive bamboo, from five miles of Ash Slough adjacent to the City of Chowchilla and removal of 2-3 feet of sand in channel to restore flood flows and reduce flooding hazards, restore habitat, and reduce excessive evapotranspiration thus preserving water for groundwater recharge.	Easements and conceptual implementation agreements in place. Permits for Arundo eradication in place. Permits still needed for sand removal. Project will start within 6 months of award.
C. Cottonwood, Dry, and Berenda Creek Arundo Eradication and Sand Removal	Madera Irrigation District	Eradication of Arundo Donax, an invasive bamboo and removal of 2-3 feet of sand in 32 miles of creeks used for agricultural water deliveries to restore flood flows and reduce flooding hazards, restore habitat, and reduce excessive evapotranspiration thus preserving water for groundwater recharge and agricultural use.	Easements and permits for Arundo eradication in place. Permits still needed for sand removal. Project will start within 6 months of award.
D. Root Creek Water District In-Lieu Groundwater Recharge	Root Creek Water District	Construction of 48-inch pipeline to deliver surface water to 3,200 acres of irrigated land currently utilizing pumped groundwater to reverse groundwater overdraft	Project plans are complete and specs are 30% complete. Environmental documentation is nearly complete. Easements, user agreements and surface water agreements are 90% complete. Project will start within 6 months of award.
E. Sierra National Forest Fuel Reduction Project	USFS, Sierra National Forest, Bass Lake Ranger District	Fuel reduction activities in areas strategically targeted to reduce the risk of high severity wildfires thus preventing flood hazards and preserving the natural filtering and slow water release functions of a healthy forest ecosystem	This funding will allow completion of some new projects and other projects already initiated but for which additional funding is needed. Some projects have environmental documentation completed. No permits are required. Some work funded by this grant may take place within 6 month of funding.

Please Note – The Attachments to this grant application have been organized by project as follows.

- The main narrative and charts are in Attachments designated .1 (work plan = 3.1, budget = 4.1, etc.)
- The backup documentation for each individual project has consistent numbering
 - Ash Slough – 3.2, 4.2, 5.2, etc.
 - Cottonwood, Dry & Berenda Creek: 3.3, 4.3, 5.3, etc.
 - Root Creek Water District In Lieu Groundwater Recharge: 3.4, 4.4, 5.4, etc.
 - Sierra National Forest Fuel Reduction Project: 3.5, 4.5, 5.5, etc.

Where one project has no backup documentation, a blank placeholder has been inserted in order to keep the numbering consistent.

Project Summaries, continued

Project B: Ash Slough Arundo Eradication and Sand Removal Project

1. Goals and Objectives

Goals:

- To improve flood flows in Ash Slough, reducing flood hazards to the City of Chowchilla and other adjacent properties
- To reduce unnecessary evapotranspiration from *Arundo Donax* infestation, thereby increasing the amount of agricultural water available for beneficial use or groundwater recharge
- To improve habitat in Ash Slough by eradicating *Arundo Donax*, an invasive exotic plant which chokes out native vegetation.

Objectives:

- Eradicate Arundo from 5 miles of slough, increasing flood flows by 1,000 cfs.
- Remove 2-3 feet of sand from 5 miles of slough, increasing flood flows by an additional 2,000 cfs.

2. How this project meets the most critical goals of the Madera IRWMP – This project helps meet two of the Plan’s major regional goals - flood hazard protection and groundwater recharge.

- It provides flood protection for the a residential area which has experienced frequent flood events causing significant damage;
- It provides additional groundwater recharge in an area which has one of the most severe groundwater overdraft issues by reducing unnecessary evapotranspiration.

Project C: Cottonwood, Dry, and Berenda creek Arundo Eradication and Sand Removal Project

1. Goals and Objectives

Goals:

- To improve flood flows in Madera County, reducing flood hazards to property, both industrial and agricultural, along Cottonwood Creek, Dry Creek and Berenda Creek

- To improve Madera County's economic viability by reducing the potential for flood flows
- To increase water availability in Madera County by reducing unnecessary evapotranspiration from *Arundo Donax* infestation
- To improve wildlife habitat in Madera County along Cottonwood Creek, Dry Creek and Berenda Creek by eradicating *Arundo Donax*, an invasive exotic plant, and by removing excess sedimentation.
- To improve Madera Irrigation District's ability to deliver water to its users without capacity constraints.
- To provide Madera Irrigation District's growers greater flexibility in managing their water, thus improving overall irrigation efficiency and use.

Objectives:

- Eradicate *Arundo* from 32 miles of creeks and an area of approximately 300 acres.
- Remove 25,000 tons of sand from 32 miles of creek bottom.

2. How this project meets the most critical goals of the Madera IRWMP - This project, like the one above, helps meet two of the Plan's major regional goals - flood hazard protection and groundwater recharge. This project also contributes to agricultural water use efficiency.

- It provides flood protection for the residential, industrial and agricultural areas which have histories of flood events causing significant damage;
- By reducing unnecessary evapotranspiration it allows more efficient use of agricultural water and provides additional groundwater recharge

Project D: Root Creek Water District In-Lieu Groundwater Recharge

1. Goals and Objectives

- Expand the available water supply by importing 6,100 AF of new surface water into the area each year.
- Improve water reliability by providing alternate water sources.
- Reduce groundwater overdraft by reducing the rate of groundwater pumping.
- Create an "in-lieu" groundwater recharge through reduced pumping and actual recharge through increased surface water supplies.
- Reduce groundwater pumping costs and the need to deepen wells or install new wells.
- Maintain the viability of irrigated agriculture in the area.
- Improve water quality by importing high quality surface water that will mix with lower quality groundwater.

2. How this project meets the most critical goals of the Madera IRWMP – This project provides a sustainable means of reducing groundwater overdraft in one of the areas with the greatest groundwater subsidence. It provides flood protection and the opportunity to utilize flood flows for additional groundwater recharge. It also preserves and improves the quality of available water by reversing groundwater subsidence; the groundwater pumped for surrounding

residential use will be higher quality shallow-level water instead of lower-quality waters found at greater depths.

Project E: Sierra National Forest Fuel Reduction Project

1. Goals and Objectives

The overall project goals are

- to reduce the likelihood of high severity wildfires which would damage the soils ability to filter and retain water,
- to prevent flood events and debris flows occurring after high severity wildfires
- increase overall forest health and resiliency to disturbances, thus preserving habitat and ecosystem functions.

Specific objectives include:

- Complete fuel reduction activities (mastication, hand thinning, piling and burning) on 3,550 acres strategically selected in the Wildland-Urban Interface (WUI) to decrease the intensity and rate of spread of wildfire in watersheds that impact the Madera Region water supplies.
- Increase stand vigor, resistance to disease, and forest resiliency on 3,550 acres thus preserving habitat values
- Implement Best Management Practices (BMPs) and BMP Evaluation Program (BMPEP) monitoring to protect soil and water resources during project implementation.

2. How this project meets the most critical goals of the Madera IRWMP – The project will significantly reduce flood hazard and debris flows which will prevent flood damage and protect water quality within the entire region. It will also preserve the water retention and slow-release functions in thousands of acres of upper watershed. The IRWMP specifically discusses the importance of water release timing to the region, including prevention of floods and maximizing beneficial use of water resources.

I. B. Discussion of synergies and linkages among projects

The Madera Region's selection of projects for funding reflects DWR's priorities and preferences in regards to the purpose and function of IRWM regions. These are set forth in the DWR RAP guidelines and include the following:

- An IRWM region must be designed or configured to diversify and strengthen the regional water management portfolio.
- The IRWM region encompasses water management system(s) containing natural and man-made components, considers watersheds, and identifies and prioritizes regional water-related projects through collaborative efforts to meet multiple water resource needs.
- The IRWM region is inclusive and utilizes a collaborative, multi-stakeholder process that provides mechanisms to assist disadvantaged communities (DAC); addresses water management issues; and promotes integrated, multi-benefit, regional solutions that

incorporate environmental stewardship toward the development and implementation of the IRWM plan.

- The IRWM region is defined to maximize opportunities to integrate water management activities related to natural and man-made water system(s), including water supply reliability, water quality, environmental stewardship, and flood management.

The Madera Region projects reflect these priorities as follows:

1. The projects reflect a regional approach to solving problems and meeting the goals of the IRWMP. Two of the major goals of the Madera IRWMP are to mitigate flood hazards and manage groundwater so as to maximize beneficial water use and reduce the groundwater overdraft. All of the proposed projects will help to meet these goals as follows.

a. Flood Hazard Reduction –

The proposed projects are part of a comprehensive flood control and mitigation project. Madera County is frequently subject to flooding during winter storms, and the proposed projects will help to alleviate flooding through a combination of vegetation management, flood channel improvements, forestland management, and floodwater diversions.

The Arundo eradication and sediment removal projects increase flood flow capacities and reduce flooding hazards in the north and west portions of the region. The Forest Service fuel reduction project prevents the conditions that lead to floods and debris flows in the east (foothill) part of the region. The Root Creek Water District project will help to alleviate flooding common in low lying areas during winter storms through diverting the flood flows to beneficial use.

b. Groundwater management to reduce overdraft – The Arundo eradication projects increase water supply for groundwater recharge by reducing the excessive evapotranspiration of water, allowing this water to percolate through the permeable stream and slough beds and recharge the groundwater basins. The in-lieu recharge project directly addresses groundwater overdraft by supplying surface water to replace groundwater pumping. The fuel reduction project maintains the healthy forest soil system which filters and retains the region's source waters, releasing them slowly for beneficial use instead of allowing overland flood flows that are contaminated with sediment and debris. All of these projects have a positive impact on reducing the groundwater overdraft within the Madera Region.

2. The projects address regional priorities (flood control and groundwater recharge) through multiple activities. These include development of new man-made water systems (in-lieu recharge), restoration of existing man-made and natural facilities (Ash Slough and Cottonwood, Dry and Berenda creek restoration) and protection of natural systems (fuel reduction for forest health).

3. The projects promote collaborative strategies involving multiple stakeholders in addressing regional issues.

a. On an individual project level, the Root Creek Water District project allows the District to fulfill their collaborative agreements with Madera Irrigation District to utilize surplus floodwater for agriculture, thereby reversing local and regional overdraft and reducing flood damage.

b. On a macro level, the Madera Region is managed by multiple entities. It includes large areas of the valley managed by water districts, un-districted areas that are the management responsibility of the County, and a very large tract of public lands managed by the US Forest Service. The IRWM process has allowed these entities to share their knowledge and integrate their groundwater management strategies. This has resulted in a collaborative implementation proposal, including a group of projects which work together to meet the most critical needs of the region.

4. The projects are spatially located throughout the region, appropriately reflecting the collective impact on the underlying groundwater basin and the connectivity between upper and lower watersheds.

a. Although proposed projects are located throughout the region in areas where their impacts are particularly needed, together they will have a synergistic effect which will benefit the entire region. Groundwater recharge may primarily benefit one area but ultimately impacts the entire basin's resources. Fuels management directly benefits the forests and the residential areas immediately adjacent, but also impacts surface water flows to valley areas. The Madera Region is one of the few IRWM regions which contains both the valley and foothills including both water source and water use areas and reflecting the essential connectivity between upper and lower watersheds. Management of foothill and mountain forestlands directly impacts the quantity and quality of waters which flow to the valley for agricultural and urban uses. The appreciation of this connectivity is relatively new among the region's water managers. The RWMG's unanimous decision to include the fuels management project in this application was a significant and positive step in the development of an integrated regional approach to collaborative water management.

I. C. Why these projects are critical to the success of the Regional effort. The Madera IRWM application focuses on two of the region's major regional goals - flood hazard protection and groundwater recharge. The proposed projects will directly further the region's goals, as stated above. Obtaining funding for these projects will have another major impact on the region; it will encourage stakeholder participation and contribution to the continued IRWM effort and promote investment in additional groundwater management activities.

I. D. How the applicant will coordinate with the project proponents and DWR.

The Applicant will have quarterly meetings with the project proponents to discuss grant implementation issues and to review status reports. Local and State-wide DWR staff will be

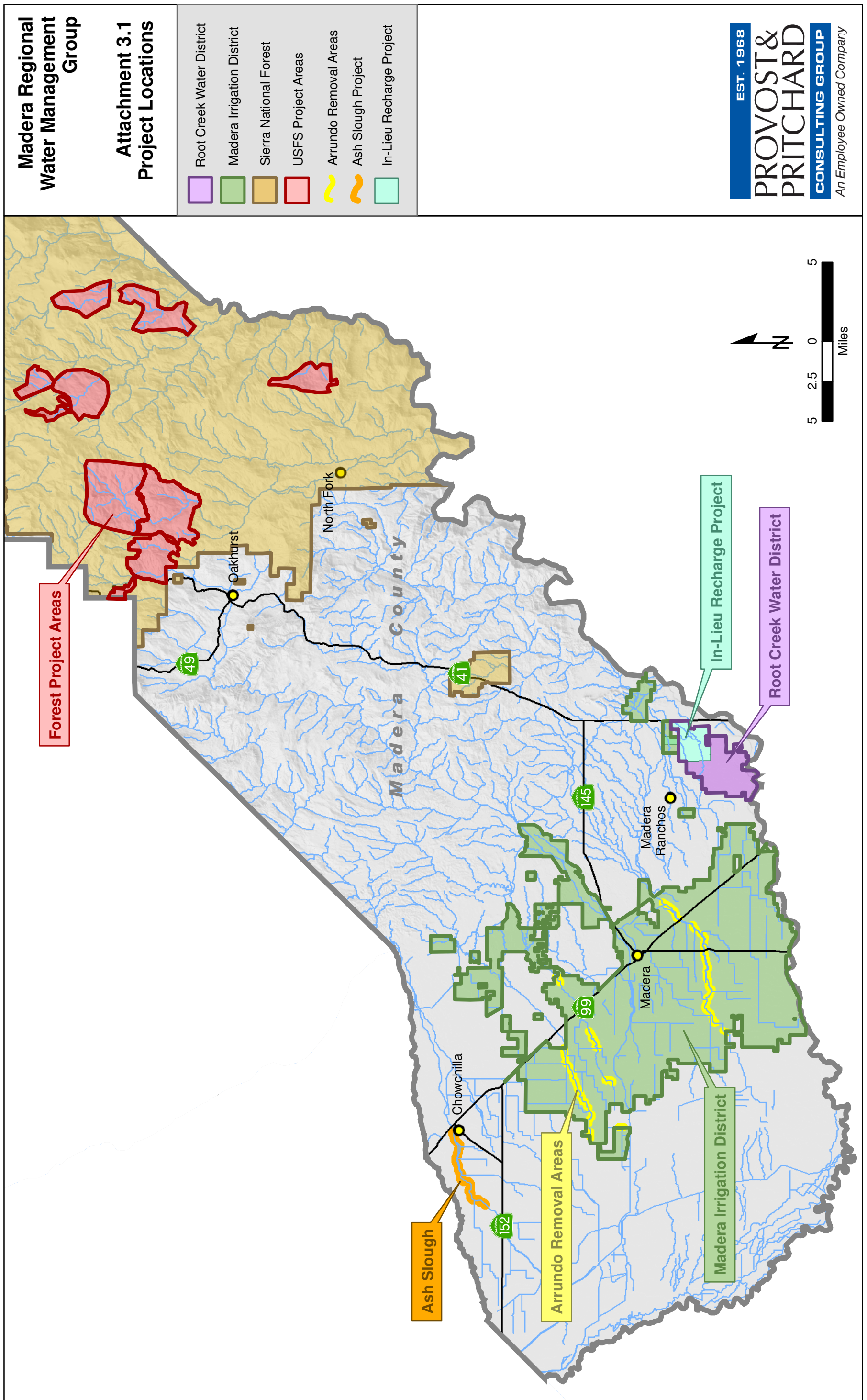
invited to attend these meetings. Project proponents will provide quarterly reports to the Applicant, which will compile them and submit them to DWR.

I. E. Project Scalability. The Applicant and the Project Proponents recognize that DWR may not have sufficient funds to cover the complete budgets of all of the projects submitted. These projects are submitted at a scale which will have the maximum benefits within the available funding constraints. However each of them can be scaled back to reduce costs if necessary, as follows:

- The Arundo Eradication and Sediment Removal projects need to take place over a three year period in order to effectively eradicate the Arundo. However, the targeted area of the Arundo eradication efforts can be scaled down to reduce costs. The result will not be as beneficial for flood control and downstream Arundo infestation prevention, but there will still be positive benefits in the areas of flood hazard reduction and habitat restoration.
- The Forest Service Fuel Reduction project sites can also be scaled down, focusing on the most strategic and beneficial sites for ecosystem protection and reduction of flood hazards due to severe wildfire events. Some areas of the watershed may still be at risk, but there would still be substantial positive impacts.
- The Root Creek In-Lieu Groundwater recharge project is not able to be scaled since scaling the construction removes the benefit of the project. However, RCWD can accept less funding and higher match to complete the project as planned, provided the reduction in funding is reasonably limited.

If circumstances make it necessary, the Applicant and the Project Proponents will meet with DWR staff to produce a revised scope of work and budget.

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Attachment 3.1, Project A – Overall Grant Administration

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Attachment 3.1 – Project A – Grant Administration

DWR Program staff recommended that Grant Administration be included as a Project in order to appropriately account for the budget costs. Because it is not an implementation project, the Work Plan information provided is simply the scope of work, as follows:

- **Task 1 Project Administration** - This task includes general administrative tasks including contract negotiations, correspondence and meetings.

- Subtask 1.1 – Administer Contract: This task includes reviewing and negotiating the contract with DWR on behalf of the project participants. Comments on the draft contract will also be collected and consolidated from all of the project participants.

Deliverables: Comments on draft contract with DWR.

- Subtask 1.2 – Bi-weekly Phone Conversations with DWR: This task includes regular correspondence with DWR staff regarding contractual issues, reporting, invoicing, contract amendments, meetings, and other administrative issues. It is assumed that DWR is contacted, on average, once every two weeks.

Deliverables: None

- Subtask 1.3 – Quarterly Project Meetings: This task includes organizing quarterly meetings with the project participants, and when needed DWR staff. Responsibilities will include preparing agenda and meeting minutes covering general administrative issues. Meetings will be held in person or by conference call.

Deliverables: Agenda and meeting minutes (these will not be submitted to DWR but will be available upon request)

- **Task 2 Project Accounting** - This task includes work related to tracking project costs, submitting pay requests, and disbursing funds to the project participants

- Subtask 2.1 – Establish Accounting System for Each Project: This task includes developing an accounting system to track costs, pay requests and payments for each of the projects and the overall grant administration phase.

Deliverables: None

- Subtask 2.2 – Track Project Expenditures - This task includes tracking project expenses, pay requests and payments for each project according to the main project tasks listed in the respective scope of work.

Deliverables: None

- Subtask 2.3 – Review and Submit Pay Requests to State - This task includes collecting, reviewing and submitting quarterly pay requests for each project to the DWR.

Deliverables: Quarterly Pay Requests.

- Subtask 2.4 – Disburse Funds to Project Participants - This task includes making payments to each of the project participants when they receive payment from the DWR.

Deliverables: None.

- **Task 3 Labor Compliance Plans:** This task includes collecting Labor Compliance Plans from each plan participant, performing a general review for completeness, and submitting them to DWR.

Deliverables: Labor Compliance Plans for each project participant.

- **Task 4 Reporting:** This task includes collecting information from the project participants to prepare and submit quarterly, annual and final reports to the DWR.
 - Subtask 4.1 – Quarterly Progress Reports - This task includes collecting, reviewing and consolidating quarterly progress reports for all of the projects and submitting them to DWR.

Deliverables: Quarterly progress reports

- Subtask 4.2 – Annual Progress Reports - This task includes compiling quarterly progress reports and other information provided by the project participants into annual reports covering all of the funded projects for submission to DWR.

Deliverables: Annual progress reports.

- Subtask 4.3 – Final Project Reports - This task includes compiling quarterly reports, annual reports, and other relevant information provided by the project participants, into one Final Report covering all of the funded projects.

Deliverables: Final Report.

- Subtask 4.4 – Data Management and Monitoring Reports - This task includes collecting and submitting relevant data management and monitoring reports for each project and submitting them to DWR.

Deliverables: Copies of Data Management and Monitoring Reports.

- Subtask 4.5 – Field Review Visits - This task includes field visits to each of the projects during major milestones, such as the beginning or end of a project. During the field visits progress will be verified and pictures and information will be collected for reporting. It is assumed that 8 total site visits will be performed.

Deliverables: Copies of Field Verification Reports.

- **Task 5 Development of Financing** - This task includes the identification of the means of cost share for each project, and providing documentation of the local cost shares.

Deliverables: Documentation of local cost share

Project costs will be tracked and invoiced according to the five main tasks, and not according to sub-task.

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**Attachment 3.1, Project B – Ash Slough Arundo Eradication and Sand
Removal**

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Attachment 3.1 – Project B – Ash Slough Arundo Eradication and Sand Removal

I. Project Introduction

A. Brief Description of Project and Implementing Agencies: This project involves the eradication of *Arundo donax*, a non-native invasive bamboo, from critical portions of Ash Slough, a flood control channel which runs adjacent to the City of Chowchilla. Heavy *Arundo* infestation in Ash Slough blocks flood flows and causes flood hazards to the nearby city as well as fire hazards, habitat deterioration, and excessive evapotranspiration of water that could otherwise be used to recharge the overdrafted groundwater. The project proponent is Madera County. Through a subcontract with the Chowchilla Water District this project will eradicate *Arundo* in areas critical to prevent levee failure and flooding of Chowchilla. Because of *Arundo*'s growing habits, it requires three years of herbicide application to effectively eradicate the infestation. The Chowchilla Water District has equipment and trained operators and can accomplish this work at a greatly reduced cost since they maintain nearby channels for their agricultural water deliveries. To further increase flood flow capacity in the slough, the County will also obtain the required permits for sediment removal from the channel. The sediment will be removed by adjacent growers on an in-kind basis since it is a valuable resource which can be used to sand roads, reducing dust and improving air quality.

B. Project Goals, Objectives and Deliverables:

Goals:

- To improve flood flows in Ash Slough, reducing flood hazards to the City of Chowchilla and other adjacent properties
- To reduce unnecessary evapotranspiration from *Arundo donax* infestation, thereby increasing the amount of agricultural water available for beneficial use or groundwater recharge
- To improve habitat in Ash Slough by eradicating *Arundo donax*, an invasive exotic plant which chokes out native vegetation.

Objectives:

- Eradicate *Arundo* from 5 miles of slough channel and banks, increasing flood flows by 1000 cfs.
- Remove 2-3 feet of sand from 5 miles of slough channel, increasing flood flows by an additional 2000 cfs

Deliverables:

- 95% *Arundo* eradicated in target 5 miles of Ash Slough channel and banks
- 2-3 feet of sand removed from 5 miles of Ash Slough channel
- Flood flows increased by 150%
- Data Monitoring Deliverables:

- Project specifications, such as the procedures, herbicides, and techniques used for eradication and restoration.
- Kill rate on the Arundo (output indicator) - Years 1, 2, and 3: percentage Arundo Reduction
- Year 4: Sediment removal report – 2-3 feet of sand removed
- Survey will be done to verify that sand has been removed in accordance with recommendations from the Ash Slough Assessment Engineering Evaluation
 - These data will be collected immediately after project completion and three years later to determine the effectiveness and resiliency of the project.
 - These data will be stored as part of the Madera County Flood Control and Water Conservation Agency's data on Ash Slough, which is maintained as part of the certification/recertification effort. Information on the techniques used in the project and their success will be disseminated to IRWM participants and stakeholders through the RWMG meetings and reports to the Chowchilla City Council, the Madera County Water Advisory Commission and the Madera County Board of Supervisors. Information will be shared with DWR through its flood control activities. Information will also be forwarded to Team Arundo del Norte, which maintains a portal of information on Arundo and Arundo eradication efforts.

C. Purpose and Need for Project: The target area of this project is the Ash Slough from Highway 99 to Road 12, five linear miles. Ash Slough splits off from the Chowchilla River (along with the Berenda Slough) at a 'bifurcation structure', approximately 10 miles upstream. (see Attachment 3.2, page 3) This structure allows the County and the Chowchilla Water District to control the relative flow of water through each of the three channels. The Ash slough was originally a natural intermittent stream which was modified to create a levee when the area began to be farmed in the mid-20th century. In 1977 the Army Corp built Buchanan Dam and improved the downstream levees to create a flood control project which became part of the State project for Flood Control. At that time, the levees were built up in a more technical manner. Even so, the banks are made of soft materials. Over time they have undergone a natural re-shaping and deterioration process in response to hydraulic conditions. The banks were not straight lines to begin with, and the high sediment flows in the sloughs (despite being downstream of a dam) have resulted in a channel that is relatively natural and meandering with tables and floodplains. Because of this, the Ash Slough (where not infested by Arundo) provides excellent habitat for native vegetation and wildlife, including important pollinators for the adjacent agricultural lands.

The Ash Slough was originally engineered for 5,000 cubic feet per second (cfs) flood flows downstream of Highway 99. (see Attachment 3.2, page 3.) Due to the buildup of sediment in the channel, the actual estimated capacity below Highway 99 is currently less than 4,000 cfs with no freeboard (or 2000 cfs with required freeboard) and in many reaches it is significantly less. (see Attachment 3.2, page 3.) Where the Arundo chokes the banks and a major portion of the channel, flow capacity is even more seriously diminished. During the dry summer and fall

months this is not a problem, since water flows are moderate, consisting of Chowchilla Water District (CWD) agricultural water deliveries as well as some groundwater recharge in wet years. However when flood releases are necessary from Buchanan Dam during the spring floods, there can be serious problems. In 1997 and 2006 flood water breached the Berenda Slough banks flooding adjacent agricultural and rural residential areas while flood waters were within one foot of overtopping the levees of the Ash Slough adjacent to the City of Chowchilla. (see Attachment 3.2, page 3)

The *Arundo* infestation in the target area of Ash Slough varies from scattered clumps at its upstream reaches to an almost solid barrier throughout the slough channel and banks at the downstream edge. (see Attachment 3.2, page 67, Photos of *Arundo* in Ash Slough) This invasive species causes a number of serious problems:

- Reduced Flood Flows from *Arundo* Growth– Where the *Arundo* grows thickly in the channel, it blocks the flow of storm water during the flood season. The capacity of the flood control facility is compromised. This blockage in the nearby Berenda Slough has resulted in the flood waters breaching the banks and flooding the surrounding community, most recently in the spring of 2006.
- Flood Danger from *Arundo* Canes – Another flood danger is present when the *Arundo* canes are washed down in flood flows, pile up and choke confined areas such as where the channel passes under a road bridge or railroad overhead. This can cause flooding of the road, as well as damage to roads, bridges and other infrastructure.
- Sedimentation and Erosion – Although *Arundo* was planted to stabilize slough banks, it can have the opposite effect. Dense, monocultural stands of *Arundo* share a network of roots that can readily trap sediment, potentially disrupting the natural flow. Heavy flood flows can undercut *Arundo* clumps causing them to break off and leave exposed soil that is subject to erosion by subsequent flows.
- Reduction in habitat – *Arundo* canes and leaves are unpalatable and provide little food or habitat for native animals. Because it grows so thickly yet has no canopy, *Arundo* provides little shade for animals and little protection from the weather. The lack of canopy also allows sunlight to raise the water temperature, additionally reducing the quality and quantity of habitat for fish and rapid evaporation of water resources.
- Excessive evapotranspiration of water resources – *Arundo* uses a great deal of water. Though actual evapotranspiration rates have not been confirmed, initial ET studies funded by the San Joaquin Valley RC&D have shown that in the Central Valley climate *Arundo* transpires approximately three times the water used by bunch grasses (such as creeping wild rye) and 10 times the water used by clonal grasses (such as Bermuda grass). This study provides credible estimates of 0.12 acre feet of water use per acres per sunny day, as opposed to 0.01 to 0.05 acre feet of water use by other native vegetation. (see Attachment 3.2, page 53.)
- Fire danger – In 2005, the city of Chowchilla received a grant from FEMA to eradicate a portion of the *Arundo* infestation within the city limits. The banks of the

Ash Slough through the City of Chowchilla had become over-run with *Arundo* which had spread from the channel to the back of residential lot fences. *Arundo* is a highly combustible even when green, and the infestation also blocked fire truck access. Each year several fires spread through the canal and slough, damaging existing riparian habitat and affecting nesting species. Because of this, FEMA provided a pre-disaster mitigation grant to eradicate the *Arundo* in this section of the Slough.¹

- Promotion of illegal dumping and activities – Because *Arundo* grows so thickly it provides an effective screen for illegal dumping and other detrimental activities, including homeless encampments, methamphetamine lab dumps, and even marijuana plantings. These are in themselves undesirable activities which may affect animal and plant habitat however the associated wastes also negatively impact the health of the waterway.

Sedimentation is also a problem which reduces flood flow capacity in Ash Slough. A July 2010 Assessment Engineering Evaluation of Ash Slough performed by HDR Consultants for Madera County's Flood Hazard Mitigation Program found that severe sedimentation of 2-3 feet in the channel. (see Attachment 3.2, page 3) A preliminary study by URS in 2009 and a more recent Assessment Engineering Report recommended that the accumulated sediment in the Ash Slough channel needs to be removed to maintain the design capacity of 5,000 cfs with acceptable freeboard at critical sections. (see Attachment 3.2, page 3) The Assessment Engineering Report concluded that the existing condition capacity of Ash Slough is approximately 2,000 cfs with 3 feet of freeboard in critical sections (or approximately 4,000 cfs with no freeboard). They concluded that the capacity would improve by 1,000 cfs if *Arundo* growth was removed and an additional 2000 cfs if the accumulated sediment in the channel was removed. It is important to note that sediment cannot be removed from the channel until the *Arundo* is eradicated.

Flood Hazard Reduction Benefits: There is potential of flooding on both the Ash and Berenda sloughs due to the lack of channel capacity to carry the released flood flows from Buchanan Dam. Bank failures can result both from over-topping and from breaches due to destabilizing factors, the most serious of which is *Arundo*.

The target area of the proposed project was selected to reduce potential of flooding in the urban areas represented by the City of Chowchilla. The Assessment Engineering Report identifies this area as one where breakout flows will occur (see Attachment 3.2, page 3) If there was flooding in this area, property damage would be extensive. Damage from the Berenda

¹ While this program has protected the residential areas next to the sloughs from fire danger, it has actually increased the danger of flooding. Since the channel capacity through the City is open but just downstream of the city the slough is blocked by *Arundo*, there is a danger the waters will back up from the downstream blockage and flood the residential areas.

Slough breach of 2006 included \$500,000 in repair costs and several million in crop damage². If flooding took place in the urban area adjacent to Ash Slough, it is expected that the damage would be approximately \$3.5 million for damage to structures, not counting the damage to the adjacent agricultural land. (see Attachment 9.1 – Project B – Flood Damage Evaluation and documentation in Attachment 9.2)

Water Supply Benefits: The project area is experiencing a groundwater overdraft which is one of the most serious in Madera County (see Groundwater Overdraft Map from IRWMP, Attachment 3.2, page 49) Groundwater is subsiding at a rate which reaches 5 feet per year. Arundo evapotranspiration is estimated at 0.12 acre-feet per day per acre of Arundo infested riparian areas. The native vegetation which otherwise exists on the slough banks utilizes .01 to .05 acre feet of water.³ (see Attachment 3.2, page 53). To be conservative, we have estimated the water savings of replacing Arundo with native vegetation to be .7 acre feet/acre per day, or 13.58 acre feet/acre/year.⁴ Our estimate of the Arundo eradication within the 5 miles of slough to be treated is 90 acres.⁵ The eradication of this Arundo will therefore save over 1200 acre-feet of water per year. This is water which would percolate through the permeable soil of the slough bank and would recharge the area's declining groundwater.

Ecosystem Impacts. The project impacts the riparian ecosystem in three major areas:

1. Flood Control/Stream Hydrology – Arundo blocks normal stream flow and therefore interferes with sediment transport, bank stability and other streambed functions. Through eradicating Arundo and restoring native vegetation, this project will restore a more natural hydrologic function to the area.
2. Habitat – *Arundo* grows so thickly that it chokes out habitat for birds and mammals. Since it lacks a canopy, it also reduces waterway shading leading to hotter water temperatures, which can harm habitat for insects. Increasing the acreage of native vegetation will result in a net increase in habitat, both for migratory and resident species.

² The total crop loss during the spring rains was \$23,050,000, according to the Madera County Agricultural Commissioner, however this includes damage from heavy rains as well as the flood. No document is currently available that splits the damage between these two causes.

³ Note that when Arundo is eradicated according to established protocols (three year herbicide and mulching process), the surrounding native vegetation will naturally spread and re-vegetate the treated area.

⁴ The research on Arundo evapotranspiration provided figures for 'sunny day' Et. In order to be conservative, we have multiplied this figure by the number of sunny days/year in this area (194, per NOAA reports). Actually the figure is probably higher since we have not counted partially sunny days when Et still takes place.

⁵ This is also a conservative estimate. The slough is about 300 feet wide, so the overall acreage of 5 miles would be 180. We are assuming Arundo infests about 50% of the total slough area. As can be seen by the photos in Attachment 3.2, page 67, there are places where the infestation is close to 100%.

Several special status species are likely to benefit from habitat enhancement and *Arundo* control on the site. Restoration of riparian areas can improve the habitat for the following species:

- Western Yellow-billed cuckoo (*Coccyzus americanus occidentalis*), a federal candidate species
- Southwestern willow flycatcher (*Empidonax traillii extimus*) a state and federally endangered species
- Least Bell's vireo (*Vireo bellii pusillus*), a state and federally endangered species
- Swainson's hawk (*Buteo swainsonii*), a state threatened species.

This information was verified by Bobby Kamansky, environmental consultant, who studied the area in preparation for a previous DWR grant application. (see Attachment 3.2, page 71)

Relation of proposal to Madera Region IRWM Plan. In Section 7.2.2.2 (Factors causing flooding), the IRWMP discusses the specific problem addressed in this proposal:

"The flood risk along the Chowchilla River, Berenda Slough, and Ash Slough is exacerbated by the limited capacity of the Chowchilla River channel system and the poor state of the levee system. A major cause of the limited channel capacity is the plant *Arundo donax*, which is choking off the channel and increases fire risk to nearby structures. In addition, the plant consumes tremendous quantities of water. The plant is not native to the area and was originally introduced to help prevent erosion problems. In addition, permitting requirements of the California Department of Fish and Game for removal of vegetation from the channels make it difficult to maintain the carrying capacity of the channels."

The IRWMP goes on in Section 7.3.1 to recommend *Arundo* Eradication as a viable flood control project as follows:

"Clearing *Arundo donax* from the water channels in the County may not stop flooding entirely. However, at a minimum, the water channels should be restored to their intended capacity... The following are the steps involved in the mapping and eradication of *Arundo donax*:

- Because the plant is so invasive and covers wide areas, the first step in effectively eradicating it is mapping its locations. This mapping can be done by employing GPS and geographic information systems (GIS). The mapping will quantify the extent of the problem and help in estimating the cost to eradicate this invasive plant.
- Eradication of *Arundo donax* by spraying and cutting followed by another round of spraying and cutting is the recommended method to be employed. According to the Levee Task Force, *Arundo donax* needs to be sprayed in September to be most effective. The first round is expected to clear 60 to 90 percent of the plant and the second round is expected to clear the remaining plants. This is expected to take 2 to 3 years."⁶

⁶ Note, there are some inaccuracies in this information as written in the IRWMP. These are corrected in the work plan and budget of this proposal.

In addition, Chapter 9 (Conclusions and Recommendations) includes the following recommendation: “9.2.2.5 Flood Control - The County was put on notice by the Central Valley Flood Protection Board (formerly the Reclamation Board) that deficiencies exist on the Chowchilla River and Ash and Berenda Sloughs. The County was recently notified by the Board that the County’s submitted corrective action plan was acceptable. In addition, the County has requested an extension of time to complete the corrective actions but have not received an answer to the request. If corrections are not made and a reinspection scheduled by the deadline, the project will be considered inactive and will not be eligible for PL84-99 rehabilitation assistance.

- The County should proceed immediately with all corrective actions as outlined in the action plan, including plans for *Arundo donax* mapping and eradication plans, channel restoration, and levee restoration and maintenance.”

Consistency with Basin Plan - This project is designed to be consistent with the basin plan for the San Joaquin Basin. The Project Proponents have coordinated with RWQCB staff and determined that consistency with the Basin Plan will be the result of utilizing best management practices in fulfilling the requirements of the State and Federal permits (DFG 1602 permit, ACE 401 and 404 permits, SWRCB SWPPP, etc.) once those permits have been issued and the requirements and conditions set forth.

II. Project Readiness

This project is ready to begin implementation immediately upon receiving a grant award, assuming that the DWR schedule of grant awards on June 1, 2011 remains accurate. This is an issue because of the timing of Arundo eradication. Arundo must be sprayed in September and October when the plant is going dormant in order to the herbicide to effectively permeate the plant rhizomes; otherwise the eradication rate will be very low. Over the course of a year, Arundo plants grow to great heights – 12 to 20 feet. Spraying plants at this height can involve use of more chemicals and increase the potential for overspray to harm desirable vegetation. In order to minimize these risks, the plant is mowed and mulched 60 days prior to spraying. The Arundo will re-grow to a height of 5 feet during that period. This height is ideal for spraying, requiring less chemical to cover the plant and reducing the risk of overspray but still providing sufficient leaf area for herbicide absorption.

The mulching must therefore take place in July and August in order for the plant to re-grow to the proper height for spraying in September and October. If the awards are made in early June, this project can proceed to implementation in 2011. If there is a delay on DWR’s part, the project may have to wait until summer of 2012 for implementation.

Work that has been (or will be) completed prior to the grant includes:

- Permits – The County has the obtained DFG 1602 stream bed alteration permit required for the Arundo eradication. Permits required for sediment removal (SWPPP, RWQCB

401, ACE 404) have not yet been obtained, however that activity will not take place until Year 2 or 3 of the grant period, so this will not delay project implementation.

- CEQA – This project is exempt from CEQA requirements under section 8 since it involves restoration of a flood control facility. A Notice of Exemption will be prepared and filed in Spring, 2011.
- There is no land acquisition involved. The County already has right-of-ways (easements) to perform maintenance of the flood control facility.
- Environmental mitigation activities are part of the work plan – they involve protection of desirable vegetation from spraying with herbicide through flagging the desired vegetation and hand-cutting or backpack-spraying the *Arundo* in the vicinity instead of using the large equipment sprayer.
- Notification of residents in properties adjacent to the treatment area will be made at least 30 days prior to spraying.
- Project design and bid solicitation – The Project Proponent (Madera County) will contract with the Chowchilla Water District to perform the mulching and spraying work. Chowchilla Water District is uniquely qualified to do this work effectively and at the lowest costs since they maintain nearby water delivery facilities and utilize the same equipment and processes. Because of this, no additional time will be required for project design or bid solicitation.

III. Data and Studies – *Arundo* eradication methodology has been developed and disseminated by Team *Arundo* del Norte, a forum of local, state, and federal organizations dedicated to the control of *Arundo donax* where it threatens rivers, creeks, and wetlands in Central and Northern California. Research and studies on technical methods are listed on the organization's website, bibliography page: http://ceres.ca.gov/tadn/Digital_Lib_index.html#control. As an example, one document summarizing *Arundo* control methodology is attached (see Attachment 3.2, page 61)

There has been some research on *Arundo* evapotranspiration, however this research was not appropriate to the conditions in Madera County. Fortunately, the San Joaquin Valley Resource Conservation and Development Council provided a grant to commission an additional study on *Arundo* evapotranspiration which is cited in this application and which is attached (see Attachment 3.2, page 53) A bibliography of other *Arundo* research is included in that document.

IV. Plans and Specifications – Plans and Specifications are not applicable to this project except as they detail methods of *Arundo* eradication. As noted below, these methods have been promulgated by a multi-agency task force and are found on the Team *Arundo* del Norte website: <http://ceres.ca.gov/tadn/>.

V. A Project Map is included at this end of this project workplan. The project will cover the five miles of Ash Slough on the non-project levees starting at the City of Chowchilla and moving downstream. A project map is included at the end of this section. The monitoring locations from this project are the same location as the work to be done. Attachment 3.2, page 49 shows

the groundwater subsidence in the area of the project which will be benefitted from the increase in groundwater.

VI. Project Timing and Phasing: This project is complete without any additional phases.

VII. Attachments – Attachments for this project work plan can be found in Attachment 3.2:

1. Assessment Engineering Evaluation for Ash Slough, July 2010
2. Valley Floor Groundwater Level Decline – Madera IRWMP Figure 5-5
3. Preliminary Comparison of Transpirational Water Use by *Arundo donax* and Replacement Riparian Vegetation Types in California
4. Global Invasive Species Database: Ecology of Arundo
5. Photos of Arundo Infestation in Ash Slough
6. Current Flora and Fauna and Restoration Plant List – Ash Slough

IX. Task List

1. General information

a. Arundo Eradication:

Arundo eradication is a three-year process.

Year 1: The first year the Arundo canes are sprayed and mulched. The mulched cane material is left on the banks in order to stabilize them until the surrounding native vegetation spreads to the area. In most cases, the Arundo is also cut and mulched also before the spraying and the canes allowed to re-grow to 4-6 feet in height before herbicide is sprayed. This is because untreated Arundo canes are often 15-20 feet tall. Spraying the herbicide upward to reach the top leaves can cause dangerous drift, harmful both for urban and agricultural areas. Arundo grows 1-2" per day, so canes are ready for spraying 30-60 days after the initial mulch. Where the canes are in the vicinity of desired vegetation (such as elderberry bushes which are habitat for the protected long-horned elderberry beetle), the canes are hand-cut and daubed with the herbicide, or sprayed by hand with a backpack sprayer. After the sprayed canes die, they are mulched in a second pass through the area. The first year spraying can kill from 50 – 95% of the Arundo growth, though in this area the experience is that the kill rate is between 50-75%.

Year 2: In the second year, the canes are again mulched, sprayed and mulched with hand-cutting where necessary.

Year 3: In the third year the remaining sparse growth is eradicated either by spraying or by cutting the canes and daubing herbicides on the wound.

The application of herbicide is generally done in September and October, just before the plants become dormant. 60 days later, when the Arundo has gone dormant or died, it can be re-mulched to remove the flood hazards from canes choking bridge under-crossings and other

narrow areas. After the third round of spraying has taken place, sand can be removed from the channel and desired vegetation can be replanted.

b. Sediment removal

In Year 4, Following Arundo eradication, excess sediment (sand) will be removed from the Slough channels. Farmers adjacent to the slough and the local Water District have indicated a willingness to remove sand from the levees for their own use at no cost. (see Attachment 4.2.5, page 23). This sand is a valuable asset for spreading on dirt roads to eliminate dust and improve air quality to comply with Air Quality requirement.

2. Area-specific information

Portions of the target area have received some treatment for Arundo eradication. The 5-mile area has been divided into sections:

- Section A – the top 4.5 miles of the target area. This section has been previous treated for Arundo; however in both cases the treatments were not maintained for the required three year period and the eradication of Arundo was not complete. By the time the proposed IRWM Implementation Project can be initiated (Summer 2011), it is estimated that the Arundo will have grown back to the original density. Three years of treatment will be needed.
- Section B – the bottom ½ mile of the target area has been treated recently by the adjacent landowner. Without knowing whether these treatments will continue it is difficult to determine the amount of herbicide and the time required for complete eradication. The best estimate is that this section will need an additional two years of treatment with less herbicide than in the fully infested areas.

The budget and schedule reflects the different costs and timelines needed to fully treat these individual sections.

3. Task Descriptions: Project B – Ash Slough Arundo Eradication

(a): Direct Project Administration Costs

Task 1: Administration

Preparation of invoices to Applicant. This task involves review of subcontractor invoices and compilation of invoices from subcontractors and County staff account work into required format for submission to the Applicant.

Deliverable: Submission of invoices to Applicant

Task 2: Labor Compliance Program

2.1 – Submission of County's Labor Compliance program to DWR – This task involves creation of the Labor Compliance Plan and submission to DWR, as well as record-keeping required by the Plan.

Deliverable: Submission of Labor Compliance Program

Task 3: Reporting – These tasks involve collecting information from staff, contractors, outreach and monitoring and compiling them in the appropriate report format for submission to the Applicant and DWR.

3.1 – Preparation and submission of quarterly project reports to Applicant

3.2 – Preparation and submission of annual project reports to Applicant

3.3 – Preparation and submission of final project report to Applicant

3.4 – Quarterly meetings of project proponents and Applicant -

Deliverable: Submission of quarterly, annual and final reports as specified in the Grant Agreement. Completion of Data Management and Monitoring reports.

Task 4: Development of Financing – not applicable

(b) Land Purchase/Easement

Task 5 – Land Purchase/Easement– This task is not applicable since Madera County already has the right (and the duty) to perform maintenance activities in the easements held by the State. (see Attachment 3.2, page 77)

(c) Planning/Design/Engineering/Environmental Documentation

Task 6: Assessment and Evaluation – not applicable

Task 7: Final Design, Deliverables: – not applicable

Task 8: Environmental Documentation

8.1 – Preparation and filing of Notice of Exemption – This project is exempt under CEQA Section 8. A Notice of Exemption will be prepared and filed for the project

Deliverable: Completion and filing of Notice of Exemption

Task 9: Permitting

9.1 – Create application for five year renewal of 1602 Stream Bed Alteration Permit – This task involves collecting information required for the renewal notice, completing the form and submitting it to the CDFG.

9.2 – Create application for 401 and 404 permits from Regional Water Quality Control Board and Army Corps of Engineers for sediment removal – This task is complex and requires the expertise of an environmental consulting firm. Information from the biological surveys, wetland delineation and similar studies are compiled in the appropriate format and submitted to the RWQCB and ACE.

9.3 – Landowner Sub-permit/Agreement for sediment removal work – In order for entities other than the County to perform work under the County's permits, sub-permits or agreement need to be put in place. The sub-permits can be attached to the grading permit or they can be stand-alone. They will assure that the requirements of the County's permits are followed and that appropriate documentation is completed. These permits will also be used for purposes of determining the total sediment removed and the increases in flood flow capacity. Subtasks include:

9.3.1 – Draft Landowner Sub-Permit/Agreement for sediment removal work

9.3.2 – Respond to agency review and comment on Sub-permit/Agreement – Sub-permits will be provided by the appropriate Agency staff for review and comment before being used.

9.3.3 – Outreach to adjacent landowners – agricultural landowners and other entities in the area which would have an interest in obtaining sand from the channel will be contacted and a meeting held to explain the program.

9.3.4 – Obtain signed Sub-permits/Agreements from landowners – This will require a small amount of interaction with the sub-permitees

9.4 – Draft Stormwater Pollution Protection Plan (SWPPP) for SWQCB – This will be needed for sediment removal.

9.5 – Draft Dust Control Plan for Air Quality District

Deliverables: 1602 Stream Bed Alteration Renewal request, 401 and 404 permit applications for sediment removal, Sub-permits for sediment removal prepared and signed by landowners, SWPPP application, Dust Control Plan

(d) Implementation

Task 10: Implementation Contracting.

10.1.1 Draft 3-year contract for Arundo removal with Chowchilla Water District – Chowchilla Water District (CWD) has performed Arundo eradication work in the areas' sloughs for the County in the past so this contract will require minimal drafting and negotiation.

10.1.2 Approval of contract by County and CWD – Attendance at Board meetings and other meetings as needed.

Deliverables: Approved contract with Chowchilla Water District for Arundo removal

Task 11: Implementation

11.1 Arundo Eradication (Note – these tasks are repeated over a three year period with minor variation based on the amount of Arundo remaining for eradication.)

11.1.1 Pre-spray mulching – An excavator with a shredder head makes two passes through the slough – one for each bank. The equipment crushes and shreds the Arundo. It takes approximately 96 hours for a mile of slough to do the two required passes. This task is done 60 days prior to spraying so that the Arundo can re-grow to a height of about 5 feet.

11.1.2.1 Spray Arundo with herbicide – The herbicide used is a 5 - 10% solution of Glyphosate, with blue dye, drift retardant and penetrant. The quantity of herbicide used depends on the thickness of the Arundo infestation. For an area with a high density of Arundo, approximately 500 gallons is used for one mile of slough.

11.1.2.2 Remove Arundo by cutting and daubing herbicide or hand spray. In cases where Arundo infestation is sparse (such as in Year 3 of treatment) or where vegetation needs to be protected from spray (such as around protected vegetation), the Arundo canes are hand cut and herbicide is daubed on the open cane.

11.1.3 Post-spray mulching – Approximately 60 days after spraying, the excavator makes two more passes through the slough to mulch the Arundo canes. The canes are left in place to prevent erosion.

11.2 Sediment Removal

11.2.1 – Notices are sent to adjacent landowners with sub-permits/agreements 60 days in advance of the approved dates for sediment removal

11.2.2 – Sediment removal

Deliverables: Arundo eradicated in 5 miles of Ash Slough, Removal of 2-3 feet of sediment in 5 miles of Ash Slough

(e) Environmental Compliance/Mitigation/Enhancement

Task 12: Environmental Compliance/Mitigation/Enhancement – not applicable

(f) Project Management/Administration

Task 13: Project Management and Oversight

13.1 Subcontractor Oversight

13.1.1 Oversight of Arundo spraying and mulching activities – The Arundo spraying contract will be overseen by the project manager. This will include meetings with the contractor prior to work commencing, site visits to assure that proper techniques are being used, and a final inspection. The County will perform three site visits during each of the three phases of the process (pre-mulch, spray and post-mulch). Other tasks include coordinate of timing, review of invoices for accuracy, etc.

13.1.2 Oversight of Sediment removal – The sediment removal process will require oversight to ensure that landowners who are removing sand are taking the proper amounts in the proper places and are observing the terms and conditions of their subcontracts. This task involves coordination, scheduling and on-site reviews.

13.2 Data Collection and Monitoring Oversight – Data collection and monitoring oversight will include overseeing the activities of monitoring and inspections for the SWPPP, the 401/404 permits and the 1602 permit, as well as the monitoring of Arundo eradication effectiveness (kill rate on Arundo). This will involve pre- and post- meetings with the monitors/inspectors, as well as preparation for these meetings and site inspections when appropriate. This task also involves making sure that information is properly stored and disseminated: Data and reports will be stored as part of the Madera County Flood Control and Water Conservation Agency's data on Ash Slough, which is maintained as part of the certification/recertification effort. Information on the techniques used in the

project and their success will be disseminated to IRWM participants and stakeholders through the RWMG meetings and reports to the Chowchilla City Council, the Madera County Water Advisory Commission and the Madera County Board of Supervisors. Information will be shared with DWR through its flood control activities. Information will also be forwarded to Team Arundo del Norte, which maintains a portal of information on Arundo and Arundo eradication efforts.

(g) Other Costs

Task 14: Permits, Monitoring and Reporting

14.1 – Surveys and monitoring required by DFG 1602 permit – This work will be done under a contract with an ecological consulting. The task includes reviews, coordination, pre-implementation surveys (such as for kit fox and other sensitive species), map preparation, coordination with CDFG, endangered species training, monitoring mulching activities during bird nesting season and preparing reports. This task must be done each year when implementation activities take place.

14.2 – Monitoring and inspection for SWPPP – An annual report on the SWPPP is required each September, and a final report/notice of termination is required at the end of the project. This work will be done by a local consulting firm.

14.3 – Monitoring and inspection of the 401/404 permits – This task involves site visits to monitor the sediment removal activities and avoidance areas as required by the 401 and 404 permits, plus drafting required reports.

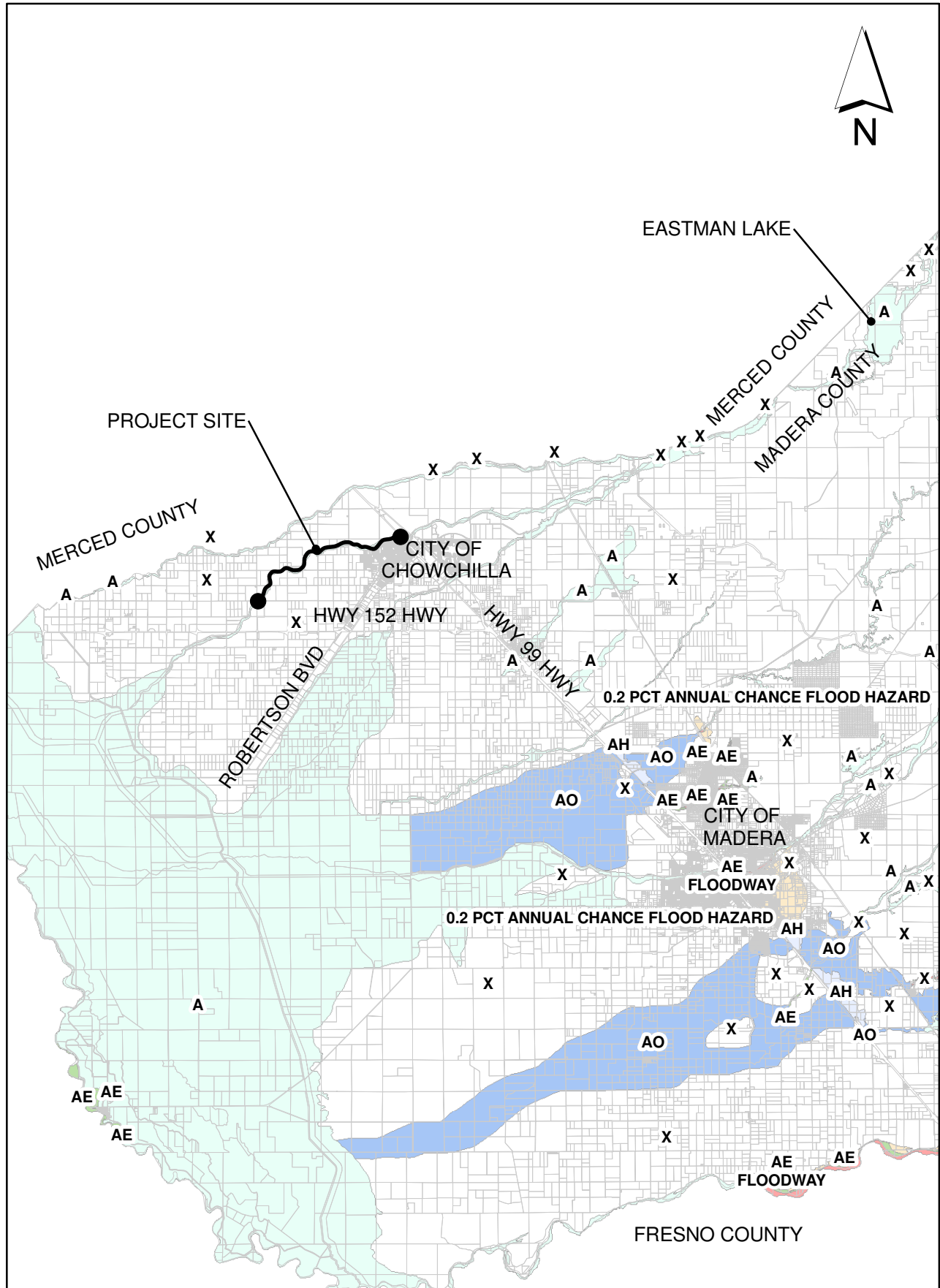
14.4.1 - Monitoring and Report on the kill rate on Arundo – The monitoring for the effectiveness of the Arundo eradication efforts will be done by the local office of the Natural Resources Conservation Service with assistance from the Coarsegold – Red Top Resource Conservation District. Staff will utilize monitoring protocol from Team Arundo del Norte for mapping and monitoring effectiveness of treatments. (see Attachment 6.2.1, page 3)

14.1.2 - Report on cubic yards/tons of sediment removed – A report will be compiled comparing goals and actual cubic yards of sand removed based on the grading/sand removal permits and the site inspections.

14.2.3 – Report on channel capacity - This report will involve engineering surveys of the 5 mile target area and drafting a final report.

Deliverables: Surveys and monitoring completed as required by permits. Reports completed confirming outcomes of activities

MADERA COUNTY - ASH SLOUGH



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**Attachment 3.1, Project C – Cottonwood Creek, Dry Creek, and Berenda
Creek Arundo Eradication and Sand Removal**

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Attachment 3.1 – Project C – Cottonwood Creek, Dry Creek, and Berenda Creek Arundo Eradication and Sand Removal

I. Project Introduction

A. Brief Description of Project and Implementing Agencies: This project is similar to the one previously described. It involves the eradication of *Arundo donax* from critical portions of Cottonwood Creek, Berenda Creek and Dry Creek. Heavy Arundo infestation in Cottonwood Creek, Berenda Creek and Dry Creek blocks flood flows and causes flood hazards to the nearby land as well as fire hazards, habitat deterioration, and excessive evapotranspiration of water that could otherwise be used to recharge the overdrafted groundwater. The project proponent is Madera Irrigation District (MID). Because of Arundo's growing habits, it requires three years of herbicide application to effectively eradicate the infestation. The MID has equipment and trained operators and can accomplish this work at a greatly reduced cost since they maintain nearby channels for their agricultural water deliveries. To further increase flood flow capacity in the creeks, MID will also obtain the required permits for sediment removal from the channel.

B. Project Goals, Objectives and Deliverables:

Goals:

- To improve flood flows in Madera County, reducing flood hazards to property, both industrial and agricultural, along Cottonwood Creek, Dry Creek and Berenda Creek
- To improve Madera County's economic viability by reducing the potential for flood flows
- To increase water availability in Madera County by reducing unnecessary evapotranspiration from Arundo Donax infestation
- To improve wildlife habitat in Madera County along Cottonwood Creek, Dry Creek and Berenda Creek by eradicating Arundo Donax, an invasive exotic plant, and by removing excess sedimentation.
- To improve Madera Irrigation District's ability to deliver water to its users without capacity constraints.
- To provide Madera Irrigation District's growers greater flexibility in managing their water, thus improving overall irrigation efficiency and use.

Objectives:

- Eradicate Arundo from 32 miles of creeks and an area of approximately 300 acres.
- Remove 25,000 tons of sand from 32 miles of creek bottom.

Deliverables:

- 95% Arundo eradicated in the targeted 17 miles of Cottonwood Creek, Berenda Creek, and Dry Creek
- 25,000 tons of sediment removed from 32 miles of Cottonwood Creek, Berenda Creek and Dry Creek
- Improve flood flows by 75%

- Data Monitoring Deliverables:
 - Project specifications, such as the procedures, herbicides, and techniques used for eradication.
 - Kill rate on the Arundo (output indicator) - Years 1, 2, and 3: percentage Arundo Reduction
 - Year 4: Sediment removal report
 - Photo Documentation
 - Recorder Comparison Data

C. Purpose and Need:

Cottonwood Creek, Dry Creek and Berenda Creek Descriptions

According to the *Millerton Area Watershed Assessment (Upper San Joaquin River)*, Millerton Area Watershed Coalition, December 2003:

“Cottonwood Creek Watershed

....(Cottonwood Creek Watershed) is situated on the Madera County side of the San Joaquin River. There are approximately 22,864 acres or more than 35 square miles of the Cottonwood watershed within the study area. The watershed consists of over 52 miles of intermittent stream drainage. The confluence of the stream at the San Joaquin River is less than a quarter mile below the base of Friant dam and Millerton Lake at approximately the 300 foot elevation, (approximately River Mile 267). The highest elevation of Cottonwood Creek is approximately 1,200 feet. Cottonwood is a naturally flowing intermittent or seasonal stream. It is a non-impaired drainage due to the fact that the Madera Canal has a siphon under the creek near its confluence with the San Joaquin River. There are no known diversions or on-stream storage facilities. There is an automated gauging station on the stream, (California Data Exchange Center ID “CTK”).”

Cottonwood Creek is the most southern of the creeks listed in the project. The project area on Cottonwood Creek is approximately 11 miles. Cottonwood Creek is a natural stream that has been channelized in the lower reaches and drains into the San Joaquin River. There are numerous County and MID structures along Cottonwood Creek. In addition, Cottonwood Creek crosses Highway 99 near Ave. 12 in Madera. Cottonwood Creek is bordered by industrial property in the upper reaches and agricultural property and rural homes in the lower reaches.

Dry Creek is a natural stream that has been channelized in the lower reaches over the years. The project area on Dry Creek is approximately 14 miles. Dry Creek drains into the Fresno River. There are numerous County and MID structures along Dry Creek. In addition, Dry Creek crosses Highway 99 near Ave. 18 ½ in Madera County. Dry Creek is mainly bordered by agricultural property and rural homes.

Berenda Creek is the northern-most creek listed in the project. The project area on Berenda Creek is approximately 7 miles. Berenda Creek is a natural stream that has been channelized in

the lower reaches. Berenda Creek crosses numerous County roads and Highway 99 near Ave. 20. Berenda Creek is bordered by agricultural property and rural homes.

Cottonwood Creek, Dry Creek, and Berenda Creek are used in the spring and summer as a water conveyance system for the District. All three creeks have several County, MID, and private structures in and adjacent to them. Flooding of these structures can lead to a significant negative economic impact. *Arundo* and sediment choke the entire channel and banks in many areas along all three creeks. Flow capacity becomes extremely minimal.

The *Arundo* infestation in the subject areas vary from scattered clumps to almost solid barriers. This invasive species causes a number of serious problems including:

- Reduced Flood Flows from *Arundo* Growth– Where the *Arundo* grows thickly in the channel, it blocks the flow of storm water during the flood season. The capacity of the flood control facility is compromised. This has resulted in the flood waters breaching the banks and flooding the surrounding properties.
- Flood Danger from *Arundo* Canes – Another flood danger is present when the *Arundo* canes are washed down in flood flows, pile up and choke confined areas such as where the channel passes under a road bridge or railroad overhead. This can cause flooding of the road, as well as damage to roads, bridges and other infrastructure.
- Sedimentation and Erosion – Although *Arundo* was planted to stabilize creek banks, it can have the opposite effect. Dense, monocultural stands of *Arundo* share a network of roots that can readily trap sediment in tidally influenced water systems, potentially disrupting the natural flow. Heavy flood flows can undercut *Arundo* clumps causing them to break off and leave exposed soil that is subject to erosion by subsequent flows.
- Reduction in habitat – *Arundo* canes and leaves are unpalatable and provide little food or habitat for native animals. Because it grows so thickly yet has no canopy, *Arundo* provides little shade for animals and little protection from the weather. The lack of canopy also allows sunlight to raise the water temperature, additionally reducing the quality and quantity of habitat for fish and rapid evaporation of water resources.
- Excessive evapotranspiration of water resources – *Arundo* has been assumed to use a great deal of water, based on comparisons with similar plants. Though actual evapotranspiration rates have not been confirmed, initial ET studies funded by the San Joaquin Valley RC&D have shown that in the Central Valley climate *Arundo* transpires approximately 20 times the water used by some native grasses.
- Fire danger –*Arundo* is a highly combustible fuel, and the infestation blocks fire truck access. Each year several fires spread throughout canals and creeks, damaging existing riparian habitat and affecting nesting species.
- Promotion of illegal dumping and activities – Because *Arundo* grows so thickly it provides an effective screen for illegal dumping and other detrimental activities, including homeless encampments, methamphetamine lab dumps, and even marijuana plantings. These are in themselves undesirable activities which may affect animal and plant habitat; however the associated wastes also negatively impact the health of the waterway.

- Decrease of Conveyance System Capacity. Reduced system capacity due to Arundo limits the amount of water deliveries available to MID customers.

Flood Potential and Causes

There is potential for flooding on Cottonwood Creek, Dry Creek, and Berenda Creek due to invasive plant species, particularly Arundo, overgrown vegetation, and sedimentation which lead to a lack of channel capacity. Without proper capacity, these channels are unable to carry the design flows or flood flows.

It is critical that flooding is reduced in these areas. These creeks are surrounded by valuable farmland. In addition, some of the areas have industrial businesses adjacent to them and others have homes and structures. All three of these creeks cross Highway 99, a major interstate route. Flooding of Highway 99 could lead to economic disaster for the entire state of California.

Watershed Impacts

The project of Arundo eradication and sediment removal impacts the watershed in three major areas:

3. Flood Control/Stream Hydrology – Arundo and sediment block normal stream flow and hinder bank stability and other streambed functions. Through removing sediment and eradicating Arundo native vegetation this project will reestablish a more natural hydrologic function to the area.

On numerous occasions, flooding has occurred on Cottonwood Creek, Dry Creek and Berenda Creek. This flooding has caused severe economic damage to property owners, the County of Madera, and the Madera Irrigation District. Roads and bridges have been washed out, crops have been lost, and structures have been flooded.

4. Water Supply – This area of the Central Valley is experiencing a severe groundwater overdraft. Groundwater is subsiding at a rate which reaches 3 feet per year. Arundo utilizes up-to 20 times more water as some of the native grasses. This is water that would otherwise either percolate through the sandy soils to recharge the groundwater, be used for agricultural purposes, or flow downstream to the Fresno River and San Joaquin River.
5. Habitat – *Arundo* grows so thickly that it chokes out habitat for birds and mammals. Since it lacks a canopy, it also reduces waterway shading leading to hotter water temperatures, which can harm habitat for insects. Increasing the acreage of native vegetation will result in a net increase in habitat, both for migratory species and residents.

Excess sedimentation suppresses native plant growth and inhibits water flow. Flooding due to sedimentation is a detriment to wildlife habitat. Flooding removes vegetation

from large areas and can increase bank erosion. In addition, when flood flows retreat from upper elevations, they carry with them invasive plant seed, sediment, nutrients, and other harmful elements.

Species of Concern

At least 4 special status species are likely to benefit from habitat enhancement and *Arundo* control on the site. Restoration of riparian areas can improve the habitat for the following species:

- Swainson's hawk (*Buteo swainsonii*)
- San Joaquin kit fox (*Vulpes macrotis mutica*)
- Giant garter snake (*Thamnophis gigas*)
- California tiger salamander (*Ambystoma californiense*)

Basin Plan

This project is consistent with the Basin Plan, particularly with respect to groundwater overdraft. The Basin Plan discusses "Mitigation of Overdraft Conditions". One of the ways to mitigate groundwater overdraft is by utilizing less water. By eliminating *Arundo* throughout the areas of concern in Madera County a significant amount of water will be conserved since it is estimated that *Arundo* utilizes up to 20 times the amount of water that native vegetation does.

In addition, by reducing the potential for flooding we are protecting our basin's resources. Erosion will be reduced, water quality will be improved, and wildlife habitat will be enhanced which all contribute to this basin's ecosystem and sustainability.

This project is designed to be consistent with the basin plan for the San Joaquin Basin. The Project Proponents have coordinated with RWQCB staff and determined that consistency with the Basin Plan will be the result of utilizing best management practices in fulfilling the requirements of the State and Federal permits (DFG 1602 permit, ACE 401 and 404 permits, SWRCB SWPPP, etc.) once those permits have been issued and the requirements and conditions set forth.

Relation of proposal to Madera Region IRWM Plan

In the IRWMP's Section 7.3.1, it recommends *Arundo* Eradication as a viable flood control project as follows:

"Clearing *Arundo donax* from the water channels in the County may not stop flooding entirely. However, at a minimum, the water channels should be restored to their intended capacity. According to the Levee Task Force, the eradication of *Arundo donax* from the water channels in the County is considered by the State to be a maintenance activity. It was recommended at one of the Levee Task Force meetings that the maintenance of the channels and levees could be done by the irrigation and water districts. They should, however, be helped with funding. The following are the steps involved in the mapping and eradication of *Arundo donax*:

- Because the plant is so invasive and covers wide areas, the first step in effectively eradicating it is mapping its locations. This mapping can be done by employing GPS and geographic information systems (GIS). The mapping will quantify the extent of the problem and help in estimating the cost to eradicate this invasive plant.
- Eradication of *Arundo donax* by spraying and cutting followed by another round of spraying and cutting is the recommended method to be employed. According to the Levee Task Force, *Arundo donax* needs to be sprayed in September to be most effective. The first round is expected to clear 95 percent of the plant and the second round is expected to clear the remaining plants. This is expected to take 2 to 3 years.”

In addition, Section 9.1.4 Flood Control under *Chapter 9, Conclusions and Recommendations* includes the following:

“...Natural obstructions to flood flow include native and nonnative vegetation growing in the floodway channels. The plant “*Arundo donax*” is a major problem in that its rapid growth and spreading is reducing channel capacities. In addition, *Arundo donax* consumes large volumes of water and is a fire hazard to nearby structures.”

II. Project Readiness

This project, like the previous Ash Slough project, is ready to begin implementation immediately upon receiving a grant award, assuming that the DWR schedule of grant awards on June 1, 2011 remains accurate. This is an issue because of the timing of Arundo eradication. Arundo must be sprayed in September and October when the plant is going dormant in order to the herbicide to effectively permeate the plant rhizomes; otherwise the eradication rate will be very low. Over the course of a year, Arundo plants grow to great heights – 12 to 20 feet. Spraying plants at this height can involve use of more chemicals and increase the potential for overspray to harm desirable vegetation. In order to minimize these risks, the plant is mowed and mulched 60 days prior to spraying. The Arundo will re-grow to a height of 5 feet during that period. This height is ideal for spraying, requiring less chemical to cover the plant and reducing the risk of overspray but still providing sufficient leaf area for herbicide absorption.

The mulching must therefore take place in July and August in order for the plant to re-grow to the proper height for spraying in September and October. If the awards are made in early June, this project can proceed to implementation in 2011. If there is a delay on DWR’s part, the project may have to wait until summer of 2012 for implementation.

Work that has been (or will be) completed prior to the grant includes:

- Permits – MID has the obtained DFG 1602 stream bed alteration permit required for the Arundo eradication. Permits required for sediment removal (SWPPP, RWQCB 401, ACE 404) have not yet been obtained, however that activity will not take place until Year 3 or 4 of the grant period, so this will not delay project implementation.
- CEQA – This project is exempt from CEQA requirements under section 8 since it involves restoration of a flood control facility. A Notice of Exemption will be prepared and filed in Spring, 2011.

- There is no land acquisition involved. The County already has right-of-ways (easements) to perform maintenance of the flood control facility.
- Environmental mitigation activities are part of the work plan – they involve protection of desirable vegetation from spraying with herbicide through flagging the desired vegetation and hand-cutting or backpack-spraying the *Arundo* in the vicinity instead of using the large equipment sprayer.
- Notification of residents in properties adjacent to the treatment area will be made at least 30 days prior to spraying.

III. Data and Studies

Arundo eradication methodology has been developed and disseminated by Team Arundo del Norte, a forum of local, state, and federal organizations dedicated to the control of *Arundo donax* where it threatens rivers, creeks, and wetlands in Central and Northern California. Research and studies on technical methods are listed on the organization's website, bibliography page: http://ceres.ca.gov/tadn/Digital_Lib_index.html#control. As an example, one document summarizing Arundo control methodology is attached (See Attachment 3.3-1)

There has been some research on Arundo evapotranspiration, however this research was not appropriate to the conditions in Madera County. Fortunately, the San Joaquin Valley Resource Conservation and Development Council provided a grant to commission an additional study on Arundo evapotranspiration which is cited in this application and which is attached (see Attachment 3.3, page 14). A bibliography of other Arundo research is included in that document.

IV. Plans and Specifications

Plans and Specifications are not applicable to this project except as they detail methods of Arundo eradication. As noted below, these methods have been promulgated by a multi-agency task force and are found on the Team Arundo del Norte website: <http://ceres.ca.gov/tadn/>.

V. Project Map

A project map is included at the end of this section. The project will cover the 32 miles of Cottonwood Creek, Berenda Creek and Dry Creek. The monitoring locations from this project are the locations where work will be done and recorder locations.

VI. Project Timing and Phasing

This project is complete without any additional phases.

VII. Attachments

Attachments for this project workplan can be found in Attachment 3.3 –

1. Global Invasive Species Database: Ecology of Arundo
2. Photos of Arundo Infestation in Cottonwood Creek, Berenda Creek and Dry Creek
3. Project Maps
4. Preliminary Comparison of Transpirational Water Use by *Arundo donax* and Replacement Riparian Vegetation Types in California

5. Valley Floor Groundwater Level Decline – Madera IRWMP Figure 5-5

VIII. Task List

MID is anticipating the following tasks will need to be performed in the Arundo eradication and sediment removal project (note, some of the tasks listed below will occur simultaneously):

1. Begin dialogue with Madera County and regulatory agencies on obtaining necessary permits
2. Begin dialogue with Caltrans and Union Pacific for clean-up of their areas of responsibility
3. Perform a vegetation survey of each creek
4. Conduct wildlife and plant surveys, as necessary
5. Conduct a pre-project baseline study of the extent of Arundo, amount of sediment, flow volumes, and other pertinent information
6. Develop a detailed schedule and work plan with MID's Operations and Maintenance Department (note, a proposed schedule and work plan is described below)
7. Review standard evacuation procedures under SEMS and NIMS
8. Research all deeds of adjacent property owners for details of easements
9. Notify adjacent property owners of project and spraying
10. Scan area for meth lab dumps and call Haz Mat for clean-up
11. Scan area for homeless encampments, marijuana farms, etc. and remove
12. Survey road access issues
13. Begin Arundo eradication as described below, starting with Year 1
14. Begin sediment removal as described below
15. Monitor the project
16. Conduct assessments of Arundo eradication, sediment removal, and flood flows by utilizing photo documentation, GPS information, GIS mapping information, and volume calculations.

Project Activities

1. Arundo Eradication:

General information: Arundo eradication and restoration is a three-year process.

- Year 1: The first year the Arundo canes are cut, mulched, and sprayed. Arundo is cut and mulched before the spraying and the canes allowed to re-grow to 4-6 feet in height before herbicide is sprayed. Untreated Arundo canes are often 15-20 feet tall and spraying the herbicide upward to reach the top leaves can cause dangerous drift, harmful both for urban and agricultural areas. Arundo grows up-to 2" per day, so canes can be ready for spraying as soon as 30 days after the initial mulch. After the sprayed canes die, they are mulched in a second pass through the area. The first year kills from 50 – 90% of the Arundo growth.
- Year 2: In the second year, the canes are again sprayed and mulched.
- Year 3: In the third year the remaining sparse growth is eradicated either by spraying or by cutting the canes and daubing herbicides on the wound within one minute. (The cost for these two methods of treatments is approximately the same, and the one chosen

will be based on the desirability of impacting the existing vegetation that has regrown through the first two years.)

The application of herbicide is generally done in September and October, just before the plants become dormant.

2. Sediment Removal:

Sediment removal will begin after Year 3 of the Arundo eradication process is complete. Sediment removal will occur when the creek is dry. Heavy equipment (a crawler) will be used to pile excess sediment in the bottom of the channel. Only sediment in the low flow channel, from toe to toe, will be removed. The sediment will then be removed from the channel using an excavator and carried off site using dump trucks. Equipment staging will be done in designated areas.

It is planned that sediment removal will begin in all three creeks the same year. However MID has planned for needing a 401/404 permit for 3 years in the event that each creek will need to be done in separate years due to such factors as the weather, the amount of Arundo to be eradicated, the time frame available, and the amount of accessible labor.

List of the permits needed and their status

- Arundo and Sediment Removal:
 - Department of Fish and Game (DFG)--1602 Stream Bed Alteration Permit (DFG)
 - MID holds a valid Stream Alteration Maintenance Agreement for Cottonwood Creek, Dry Creek, and Berenda Creek
 - California Environmental Quality Act (CEQA)
 - DFG stated that the project is exempt from CEQA and we will file a Notice of Exemption
 - Regional Water Quality Control Board (RWQCB) and/or Army Corps of Engineers (ACOE).
 - The Arundo removal (without disturbing the soil) can be done without any permits from RWQCB and/or ACOE
 - The removal or disturbance of sand requires a 404 and 401 permit. The 401 can cost up to \$40,000 per year depending on the area disturbed, \$2,752 per acre up to \$40,000.
 - Madera County Agricultural Commissioner
 - MID will work with the Madera County Ag Commissioner in obtaining a permit for herbicide application
 - Stormwater Pollution Protection Plan for SWQCB

3. Task Descriptions: Project C – Cottonwood Creek, Berenda Creek and Dry Creek Arundo Eradication:

(a): Direct Project Administration Costs

Task 1 – Administration:

Task 1.1 – Invoice preparation and documentation is estimated to take an average of 5 hours a month for the 48 month period of the grant. Madera Irrigation District's will be doing the implementation work in house with the assistance of Consultants.

Deliverable: Submission of Invoices to Applicant

Task 2 – Labor Compliance Program:

Task 2.1 – Labor compliance plan will be created by subconsultant

Deliverable: Submission of Labor Compliance Program

Task 3 – Reporting:

Task 3.1 – Quarterly reports are estimated to take 20 hours each. There will be 15 quarterly report (remaining quarter will be included in final report.)

Task 3.2 - Annual reports are estimated to take 10 hours each and there should be 3 annual reports (the remaining annual report will be the final report). They will be more comprehensive but the information for the quarterly reports will already be compiled.

Task 3.3 - The Final report is estimated to take 40 hours, figuring in requests for clarification from DWR. These tasks will be completed by the MID Engineering Department.

Task 3.4 – It is estimated that Partnership meetings will occur once a quarter and will take approximately 4 hours for preparation and meeting attendance.

Deliverables: Submission of quarterly, annual, and final report as specified in the Grant Agreement. Completion of Data Management and Monitoring Reports.

(b): Land Purchase/Easement Costs

Task 5 – Land Purchase/Easement – not applicable. MID has the right to maintain facilities that are used for MID water conveyance.

(c): Planning/Design/Engineering/Environmental Documentation Costs

Task 8 – Environmental Documentation:

Task 8.1 –A Notice of Exemption will be prepared and filed on behalf of MID by Madera County.

Deliverable: Completion and filing of Notice of Exemption

Task 9 – Permitting:

Task 9.1 – The application for renewal of a 1602 permit takes less time than the initial permit but follow-up and negotiation is still required. MID will need to complete a report and compile the documents required for permit renewal. The estimated hours are therefore 60 for this task.

Task 9.2 – The applications for the 401 and 404 permits are substantial due to the fact that you will be dealing with two agencies, US Army Corps of Engineers and the Regional Water Quality Control Board. Negotiations, document

preparation, and possibly meetings and site visits will be required. 120 hours are estimated for this work.

Task 9.3.1, 9.3.2 and 9.3.3 – In order to assure compliance with the 401 and 404 permits and for the benefit of all parties involved, an access agreement will be created between MID and the landowners adjacent to the creeks whose property will be affected by this project. This task is estimated to require 24 hours. Legal review of this document will require an additional 3 hours. Obtaining signed agreements with landowners is going to take approximately 24 hours. These hours are more than those estimated for Ash Slough due to the fact that MID will be dealing with 32 miles of stream and many more landowners.

Task 9.4 – Drafting the SWPPP for the SWQCB – This is a specialized task that will be contracted out.

Deliverables: 1602 Streambed Alteration Renewal request, 401 and 404 permit applications for sediment removal, access agreements with landowners, and SWPPP application.

(d): Implementation Costs

Task 11 – Implementation

Task 11.1.1 – According to estimates by MID's Operations and Maintenance staff and MID's Engineering staff, the costs for mulching one mile of creek is \$11,113. This cost assumes it will take a MID 2 man crew plus equipment 40 hours to do one mile of creek on both sides. The cost for spraying one mile of creek is \$24,320 per mile and the cost for cutting and daubing one mile of creek is \$4,382. This totals \$39,815 per mile of creek for Arundo eradication. In the first year of Arundo removal it is estimated that there is 17 miles of Arundo to remove in the 32 total miles of creek, refer to Arundo Location Maps, Attachment 3.3-3. The total for Arundo removal in the first year is estimated to be \$676,855; refer to Attachment 4.3-1.

Task 11.1.2 – Assuming a 40% Arundo eradication success rate, the total miles of Arundo removal to occur in the second year is 10 miles. At a rate of \$39,815/mile, as described in Task 11.1.1 the total will be \$398,150.

Task 11.1.3 – Assuming a 40% Arundo eradication success rate, the total miles of Arundo removal to occur in the third year would be 6 miles. At a rate of \$39,815/mile, as described in Task 11.1.1 the total will be \$238,990.

Task 11.2 – Letters to adjacent landowners will be sent out notifying them of the Arundo eradication and sediment removal. It is estimated that this will take approximately 8 hours per year for four years. This includes the time to draft the letter, sending the letter out, and answering questions from landowners.

Task 11.3 – Sediment removal will be done in house by MID's Operations and Maintenance staff. It is estimated that it will take a crew of 2 men, excluding equipment operators, 20 hours to remove sediment from 1 mile of creek.

Deliverables: 95% of Arundo eradicated in 17 miles of creek, removal of 25,000 tons of sediment.

(f): Project Management/Administration

Task 13 – Project Management/Administration

Task 13.1.1 – The Arundo spraying contract will be overseen by MID's Engineering Department. This will include meetings with the MID Operations and Maintenance staff prior to work commencing, site visits to assure that proper techniques are being used, and a final inspection. This is estimated to take 60 hours per year, or 240 hours over the life of the project. These hours are more than those proposed for the Ash Slough project due to the fact that Ash Slough will be hiring contractors and MID will be utilizing in house staff so more oversight is necessary.

Task 13.1.2 – The sediment removal process will require MID Engineering Department's oversight to ensure sand is being removed from the proper places in the proper amounts. Removal activities will be scheduled and spot inspections will be done for each landowner. Inspections are estimated to take 60 hours per year this equals 240 hours for four years. These hours are more than those proposed for the Ash Slough project due to the fact that Ash Slough will be hiring contractors and MID will be utilizing in house staff so more oversight is necessary.

Task 13.2 – Data collection and monitoring oversight will be done by MID's Engineering Department and will include overseeing the activities of monitoring and inspections for the SWPPP, the 401/404 permits and the 1602 permit, as well as the monitoring of Arundo eradication effectiveness (kill rate on Arundo) and sediment removal. This will involve pre- and post-meetings with the monitors/inspectors, as well as preparation for these meetings and site inspections when appropriate. It is expected that this will take 90 hours per year, or a total of 360 hours.

Deliverables: Photo documentation, monitoring reports.

(g): Other Costs

Task 14 – Other Costs

Task 14.1.1 – Raptor and avian surveys are required by MID's DFG permit.

Task 14.1.2 – Baseline studies will include mapping existing Arundo in the field using a handheld Global Positioning System (GPS) and high quality aerial photos. This will be done before the project begins and each subsequent year to determine the success of the project. This information will be used with Geographic Information System (GIS) to map the existing Arundo locations.

- MID will develop a photo documentation study. MID will set up photo monitoring locations along each creek. At distinct time intervals MID will photo document the creek to determine if the Arundo removal is successful and the effects on native vegetation and habitat. MID will map these location in GIS also.

- MID has collected flood data on each of the three creeks, Cottonwood Creek, Dry Creek, and Berenda Creek, since 1966. MID collects flood data in the upper reaches near where it enters the District and in the lower reaches where it exits the District. MID will continue to collect this data and will create a database for data management.
- MID will assess the amount of sediment in each creek that needs to be removed by field studies and observations.
- It is estimated that the first year of baseline studies will take approximately 160 hours for field work and data management. The following years will take approximately 60 hours for each year (3 years) for a total of 340 hours.

14.2 – Monitoring and inspection for SWPPP – An annual report on the SWPPP is required each September, and a final report/notice of termination is required at the end of the project.

14.3 – Monitoring and inspection of the 401/404 permits will take approximately 40 hours per year per of the permit (3 years).

14.4.1 - Report on kill rate of Arundo. This report will be created by the MID's Engineering Department and Operations and Maintenance staff. It is estimated that this will take 24 hours each year to complete for 4 years.

14.4.2 - Report on cubic yards/tons of sediment removed – This report will be created by the MID's Engineering Department and Operations and Maintenance staff. It is estimated that this will take 8 hours each year to complete for 3 years.

Task 14.5.1 – Permit fee, Department of Fish and Game 1602 permit extension–

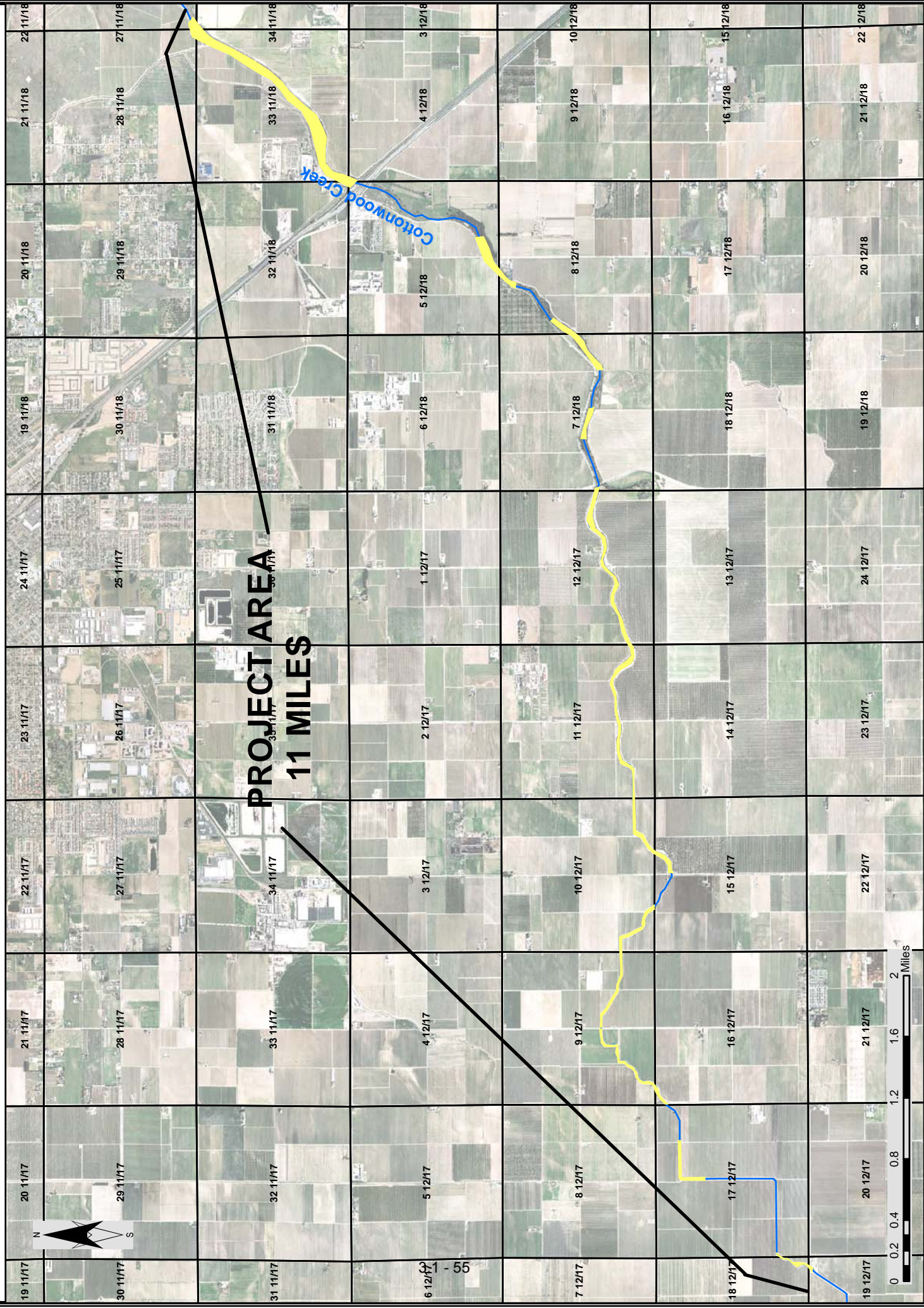
Task 14.5.2 – The removal or disturbance of sand requires a 404 and 401 permit from the Regional Water Quality Control Board (RWQCB)/Army Corps of Engineers (ACOE). It is anticipated that one creek will be done each year so the permit is needed for 3 years.

Task 14.6—MID is anticipating that additional surveys and requirements could be required when we renew our DFG and possibly 401/404 permits.

Deliverables: Surveys and monitoring required by permits. Reports completed confirming the outcome of activities.

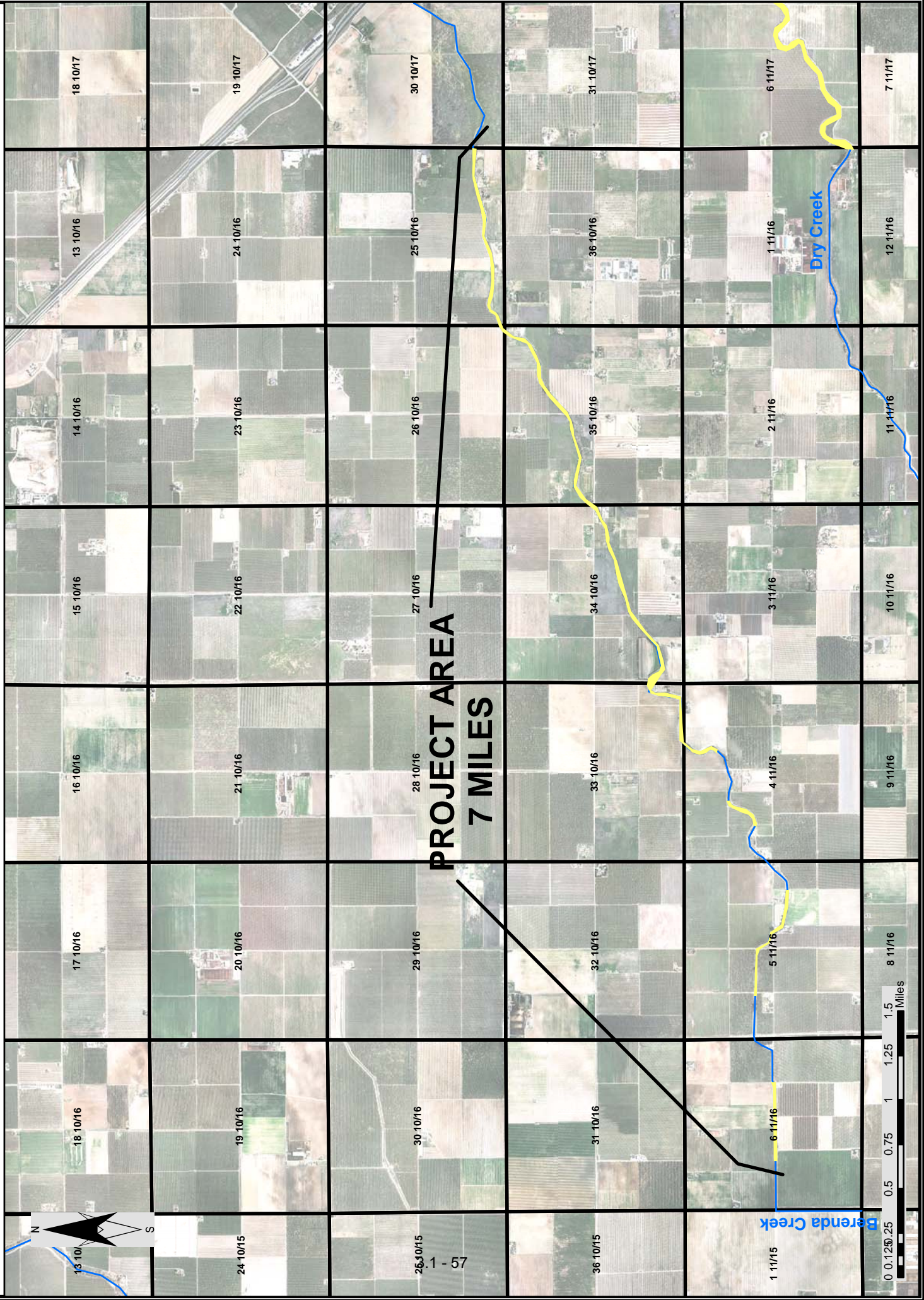
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COTTONWOOD CREEK ARUNDO LOCATION MAP



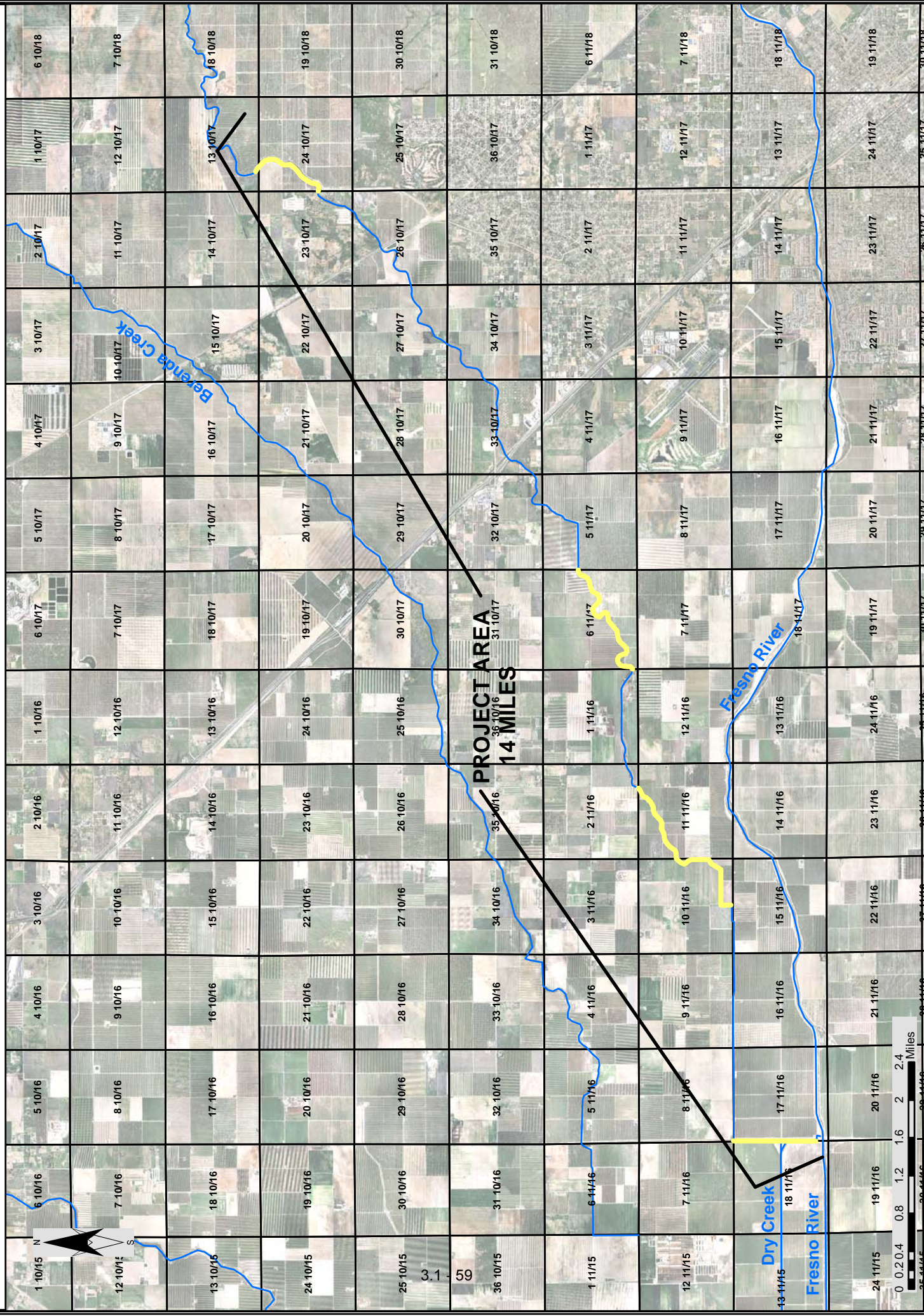
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BERENDA CREEK ARUNDO LOCATION MAP



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DRY CREEK ARUNDO LOCATION MAP



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Attachment 3.1, Project D – Root Creek In-Lieu Groundwater Recharge

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Attachment 3.1 – Project D – Root Creek In-Lieu Groundwater Recharge

I. Project Introduction

A. Introduction

The Root Creek Water District ‘In-Lieu Groundwater Recharge Project’ includes the acquisition of surface water supplies and construction of a new 48-inch diameter pipeline that would deliver surface water to an initial 3,200 acres of lands that currently rely exclusively on groundwater. The project would deliver surface water ‘in-lieu’ of groundwater pumping and thus preserve groundwater resources creating an “in-lieu” groundwater recharge. The project area currently has an annual 3 foot to 5 foot groundwater level decline (see Attachment 3.4, page 3). Funding is requested for constructing the pipeline to convey water supplies that have already been secured by RCWD. A vicinity and project map showing the location of the project, showing the area that would be served by the surface water, and the locations of the proposed facilities is located at the end of this section.

Surface water would be delivered to Root Creek Water District (RCWD) through Madera Irrigation District (MID) facilities under existing water purchase; conveyance and exchange agreements (see Attachment 3.4, page 439). Water would be diverted into RCWD through a proposed turnout on MID’s Lateral 6.2 shown in the project map at the end of this section. Additional facilities would include 2.7 miles of 48-inch diameter concrete pipe, 4.2 miles of lateral pipes ranging in diameter from 4 to 24 inches, and twelve connections to existing irrigation pump stations owned by individual property owners.

Using available surface water supplies per existing agreements, the proposed pipeline will deliver, on average, 6,100 AF/year to the project area. In wet years, if additional water supplies are available for purchase, the pipeline would be able to provide all of the water demands in the project area, or about 9,400 AF/year. Water would be delivered during the irrigation season, typically running from March to November. If the pipeline were to be operated continuously the pipeline will have capacity to convey about 50 cfs, or about 36,000 AF/year. Therefore, the project yield could be increased if the project area is expanded or the pipeline is connected to recharge facilities. The proposed project is the first phase in a potentially larger project that could deliver water to most of RCWD.

The water sources include San Joaquin River Section 215 floodwater, CVP water supplies purchased from Madera Irrigation District, and a firm water supply purchased from the Westside Mutual Water Company.

The project would import new surface water supplies into Madera County. Every acre-foot of surface water delivered by the project will offset an acre-foot of groundwater pumping and reduce overdraft in the local area and surrounding communities. The project will help to reverse the net overdraft in Southeastern Madera County of 22,000 AF/year, as referenced in a report by Kenneth D. Schmidt Associates entitled ‘*Hydrogeologic Investigation – Southeastern Madera County*’, prepared in 1998 and updated in 2001. The estimated overdraft within RCWD

is 3,400 AF, which is referenced in the same study. The project yield of 6,100 AF will not only mitigate for this local overdraft, but also deliver a net positive balance of 2,700 AF/year (6,100-3,400) within RCWD. The surface water delivery will also help to improve local water quality and improve water reliability.

Significant work has already been completed on the project including a DWR funded feasibility study, project designs, permitting, legal agreements, and a previous grant application. Construction of the project can begin within five months of receiving a grant award, and be completed in six months thereafter. RCWD, Madera County and MID would work together during the construction process to ensure all local, state and federal requirements are adhered to.

B. Project Goals, Objectives and Deliverables

The project goals and objectives include the following:

1. Expand the available water supply by importing 6,100 AF of new surface water into the area each year. Some of the imported surface water would be San Joaquin River Section 215 floodwater that will be diverted from the River during winter – spring flows. This water would otherwise not be utilized and could potentially cause damage to crops in downstream areas that flood frequently.
2. Improve water reliability by providing alternate water sources.
3. Reduce groundwater overdraft by reducing the rate of groundwater pumping.
4. Create an “in-lieu” groundwater recharge through reduced pumping and actual recharge through increased surface water supplies.
5. Reduce groundwater pumping costs and the need to deepen wells or install new wells.
6. Maintain the viability of irrigated agriculture in the area.
7. Improve water quality by importing high quality surface water that will mix with lower quality groundwater.

C. Purpose and Need

The project is needed in order to help reduce and reverse the overdraft situation in Madera County. The proposed imported surface water will be used to irrigate agricultural fields rather than using pumped groundwater. The project would deliver surface water ‘in-lieu’ of groundwater pumping and thus preserve groundwater resources creating an “in-lieu” groundwater recharge. RCWD and the surrounding areas experience an average 3-5 foot annual decrease in groundwater elevation and groundwater quality testing has shown poorer quality water with increasing depth.

D. Linkages

Root Creek Water District will be purchasing surplus Central Valley Project waters from Madera Irrigation District (MID) and Chowchilla Water District (CWD). These waters are available when short-term supplies exceed local demands in MID and CWD. By purchasing this water, RCWD

will help to ensure that MID and CWD's allocations are fully utilized and do not flow out of the IRWMP area, thus benefitting the entire region.

II. Project Readiness

The project plans have been completed and the project specifications are 30% complete. The environmental documents are anticipated to be complete prior to the grant award date in June 2011. The CEQA permitting documents were time sensitive tasks and have been completed. All the Water purchase contracts are completed and in place except the Section 215 contract. That contract will be completed prior to the funding award. See Attachment 3.4, page 233 for the contract status. There is no site environmental mitigation required except for being aware of and not interfering with the nesting locations of some migratory hawks that might be in the area. RCWD has already committed \$5.3 million of their money into developing this project. The total amount invested through RCWD and state funds is nearly \$10 million. This demonstrates RCWD's commitment to completing this project in a timely manner. RCWD has already secured the property easements and land owner usage agreements required for the project. The project will be ready to start construction less than six months after the contract award.

III. Data and Studies

Numerous supporting documents and studies have been prepared for the RCWD "In-Lieu" Groundwater Recharge Project. The documents listed below have been included in the Attachments.

1. *Tiered Initial Study/Negative Declaration for the RCWD/MID Conveyance Facilities, Contract for Temporary Receipt of Section 215 Waters and Water Transfer and Exchanges Project.* (Resolutions 2010-07 & 2010-08 dated November 17, 2010, approving Negative Declaration)
2. *Biotic Evaluation, RCWD Pipeline, Gateway Village* prepared by Live Oak Associates, Inc. dated February 6, 2007.
3. *A Cultural Resources Survey for the RCWD In-Lieu Groundwater Recharge Facilities Project Avenue 12 at Road 40*, prepared by Sierra Valley Cultural Planning, dated February 2007.
4. *In-Lieu Groundwater Recharge Facilities Feasibility Study*, prepared by Provost and Pritchard Engineering Group, Inc. dated April 30, 2003.

The documents listed below are also relevant to the proposed project. They are not attached due to space limitations but are available upon request by DWR staff.

1. *AB303 Project Summary Report*, Provost & Pritchard Engineering Group and Kenneth D. Schmidt & Associates, May 2003.
2. *Root Creek In-Lieu Groundwater Recharge & Storage Project Proposition 13 Groundwater Storage Program Construction Grant Application*, June 2003.

3. *Hydrogeologic Investigation – Southeastern Madera County*, Kenneth D. Schmidt & Associates, October 2001.
4. *Hydrogeologic Investigation – Southeastern Madera County*, Kenneth D. Schmidt & Associates, June 1998.
5. *Groundwater Management Plan*, Root Creek Water District, Provost and Pritchard Engineering Group, October 13, 1997.

IV. Plans and Specifications, Project E – Root Creek Water District, In-Lieu Groundwater Recharge

The main pipeline plans have been designed to the 95% stage and project specifications are at the 30% stage. Currently, the PVC lateral plans are conceptual in nature, and will be complete in 2011. See Attachment 3.4, Page 7 for preliminary plans and specifications. The plans and specifications for the main pipeline have been approved by the Madera Irrigation District and USBR.

V. Project Map

A project location and vicinity map have been included at the end of this section.

VI. Project Timing and Phasing

The RCWD “in-lieu” groundwater recharge project pipeline is oversized for the first phase of the project. The ultimate pipeline size has been proposed due to the problem of upsizing the pipe in future years. If additional surface water becomes available, RCWD will have the pipeline capacity to transport and provide additional irrigation water. However, future project phases are conceptual and no funding is being requested for them at this time.

VII. Attachments

The following is the list of attached figures that pertain to/are referenced in support of topics within Attachment 3 – Work Plan:

Attachment 3.4, page 3	Valley Floor Groundwater Level Decline Exhibit
Attachment 3.4, page 7	Construction Plans and Specifications
Attachment 3.4, page 207	Property Easement
Attachment 3.4, page 233	USBR Section 215 Water Status, and Resolutions 2010-07 & 2010-08 dated November 17, 2010, approving <i>Tiered Initial Study/Negative Declaration for the RCWD/MID Conveyance Facilities, Contract for Temporary Receipt of Section 215 Waters and Water Transfer and Exchanges Project</i>
Attachment 3.4, page 305	<i>Biotic Evaluation, RCWD Pipeline, Gateway Village</i>
Attachment 3.4, page 357	<i>In-Lieu Groundwater Recharge Facilities Feasibility Study</i>

Attachment 3.4, page 419 *A Cultural Resources Survey for the RCWD In-Lieu Groundwater Recharge Facilities Project Avenue 12 at Road 40*
Attachment 3.4, page 439 Surface Water Contracts
Attachment 3.4, page 519 Property Owner Payment Agreement

VIII. Task Descriptions, Project E – Root Creek Water District, In-Lieu Groundwater Recharge

Project Tasks, Project E – Root Creek Water District, In-Lieu Groundwater Recharge

(a) Direct Project Administration Costs

Task 1 – Project Administration

This task will include the project administration related work involved in the project. Specific tasks will include meetings, conference calls, reimbursement requests, engineering consultant management, and overall project coordination.

Deliverable: Preparation of project reimbursement requests and invoices.

Task 2 – Labor Compliance

RCWD will prepare, or hire a sub-consultant to develop, and implement a Labor Compliance Program for the project in compliance with Local, State and Federal requirements.

Deliverable: Submission of Labor Compliance Program

Task 3 – Reporting

This task will include quarterly and annual project reports and all other reporting obligations in accordance with the grant contract requirements. This task will also include preparation of a project draft and final project report. The report will summarize the project activities identified within this work plan, including a comparison of the scope, budget and schedule of the items performed. The draft report will be prepared and submitted to DWR for review and comment. Upon receipt of DWR comments, a final project report will be prepared and resubmitted to DWR.

This task also includes all project performance measure monitoring and reporting.

Deliverables: Submission of quarterly, annual and final reports as specified in the Grant Agreement. Monitoring report.

Task 4 – Financing Development

The grant guidelines require at least a 25% funding match, which equates to \$1.375 million. Root Creek Water District has signed agreements with landowners served by the project to provide the cost share either through a

direct cash payment or assessments applied to their lands (see Attachment 3.4, page 519).

Deliverables: Submission of land owner agreements and proof of cash reserves once paid.

(b) Land Purchase/Easement

Task 5 – Land Purchase/Easement

No property acquisition or additional easements will be needed for the project. RCWD has easements from private landowners for all of the proposed pipelines (see Attachment 3.4, page 207).

Deliverables: No deliverables required since easements have already been executed.

(c) Planning/Design/Engineering/Environmental Documentation

Task 6 – Assessment and Evaluation, Deliverable, and Technical Studies

The Assessment, Technical and Feasibility studies have been completed for the RCWD In-Lieu Groundwater Recharge Project. There is no work to be completed for this task.

Deliverables: No deliverables required since all studies have been completed.

Task 7 – Final Design

This task will include the update of the 95% design of the turnout structures, main pipeline, pump station connections, and preparation of plans, and cost estimates. The update of the 30% project specification bidding documents and costs estimates will also be completed as part of this task. The plans and specifications for the lateral pipelines will also be prepared. These will include a preliminary design (30% complete), draft final design (90% complete) and final design (100% complete).

Deliverables: Completion of project plans and specifications.

Task 8 – Environmental Documentation

This task includes the required environmental processing, and documentation involved in the project. Both of these items are closely interrelated, so are described here together. The two environmental regulations that need compliance relate to NEPA and CEQA. Since the project will not involve Federal monies, nor a Federal decision NEPA does not apply. CEQA consists of 1) preparation of initial studies to identify potential project impacts, 2) undertaking scientific and biological reviews to identify the existing conditions and potential impacts from construction and/or operations of the proposed project and 3) public input through meetings, public hearings and the formalized process of publication, circulation and adoption. The majority of the environmental documentation for the project is complete.

Planning and Regulatory Environmental Documents

<i>Agency</i>	<i>Description</i>	<i>Determination/Status</i>
Madera County / USBR	RCWD prepared a CEQA Initial Study for the project, and issued an NOI to adopt a Negative Declaration on October 15, 2010. The Negative Declaration was adopted at a public hearing on November 17, 2010. USBR has accepted the biological studies and cultural and historical resources studies for the project.	Completed, Negative Declaration Adopted
Friant Water Users Authority, MID, Chowchilla Water District and RCWD	This is a cooperative agreement with the Friant Water Users Authority, Madera Irrigation District, and Chowchilla Water District and RCWD to sell and deliver surplus waters to RCWD when possible.	Agreement obtained
MID and RCWD	This agreement outlines terms for RCWD to purchase up to 10,000 AF/year of surplus Class 2 water from MID. This agreement also provides for all conveyance of the RCWD water from Millerton Lake to the new RCWD turnout.	Agreement obtained
USBR	The District has negotiated for a long-term Section 215 floodwater contract with the USBR. The District needs to provide a down payment for final acceptance.	Contract pending down payment to USBR (see attachment 3.4, page 233)
Westside Mutual Water Company and RCWD	RCWD has an agreement with Westside Mutual Water Company (Westside) to deliver a firm water supply of up to 7,000 AF/year.	Agreement obtained

Task 9 – Permitting

Permitting for this project will be required from State and Local agencies. Each of the identified agencies will be contacted and have jurisdiction over portions of the project. The permits identified herein are grouped into two areas. The first are permits that are required during the planning, regulatory and design phase. The other group consists of permits that are required for construction. RCWD does not anticipate any problems in securing these permits. All initial permit application fees will be billed under this task.

Planning, Regulatory and Design Phase

<i>Agency</i>	<i>Permit</i>	<i>Permit Obtained</i>	<i>Description/Status</i>
San Joaquin Valley Air Pollution Control District	Indirect Source Review (ISR)	ISR Determination to be provided	To be obtained during planning stages. A determination needs to be given by the San Joaquin Valley Air Pollution Control District

Construction Phase

<i>Agency</i>	<i>Permit</i>	<i>Permit required</i>	<i>Description/Status</i>
State Water Resources Control Board	Construction General Permit	Yes (to be obtained by contractor)	For control of drainage to/from property
San Joaquin Valley Air Pollution Control District	Permit	Yes (to be obtained by contractor)	Emissions on Equipment
Madera County	Encroachment Permit	To be obtained by Contractor	Encroachment permit will be required for any construction or staging on Madera county right-of-way.
Madera Irrigation District	Encroachment Permit	To be obtained by Contractor	Encroachment permit will be required for any construction or staging on MID right-of-way.

Deliverables: Section 215 Water Contract, SWRCB Construction General Permit SWPPP documentation, San Joaquin Valley Air Board documentation

(d) Construction/Implementation

Task 10 – Construction Contracting

The task for Construction Contracting will include the following activities:

- Bidding documents will be prepared for all construction work.
- RCWD will conduct a public bid process in accordance with RCWD and State requirements to secure a licensed contractor experienced with the required construction. This task also includes:
 - Pre-bid meetings
 - Answering questions during the bidding process
 - Bid opening meeting and evaluating submitted bids
 - Preparing construction contracts

Deliverables: Prepare advertisement for bids; pre-bid contractors meeting; evaluation of bids; construction contract

Task 11 – Construction

This task includes the construction activities of the proposed facilities. All construction will meet all applicable local, state and federal codes and regulations.

- Subtask 11.1 – Project Mobilization/On-Going Duties

This task includes the pre-construction meeting, the project site clearing and construction equipment and material lay-down and staging area. This task also includes the onsite maintenance required to ensure that existing facilities are not interfered with and that all Stormwater Pollution Prevention and Dust Control Prevention measures are in place.

- Subtask 11.2 – MID/RCWD Turnout Structure

This task includes the construction costs of purchasing materials, construction and installation of all required appurtenances to connect the existing MID Lateral 6.2 to the proposed 48-inch pipeline.

- Subtask 11.3 – 48 inch pipeline installation

This task includes the construction costs of purchasing materials, construction and installation of all required pipeline and appurtenances to connect to the existing MID Lateral 6.2 to the proposed PVC laterals.

- Subtask 11.4 – Lateral construction and installation

This task includes the construction costs of purchasing materials, construction and installation of all required PVC lateral pipeline and appurtenances to connect to the proposed 48-inch pipeline.

- Subtask 11.5 – Connection to Existing Pump Stations

This task includes the construction costs of purchasing materials, construction and installation of all required pipeline and appurtenances to connect to the proposed 48-inch pipeline and/or lateral pipelines.

- Subtask 11.6 – Facility Testing

This task includes the facility testing of the turnout structure, 48-inch pipeline, PVC laterals, and pump stations. All testing will meet the specifications of the construction documents and manufacturer recommendations. Testing will comply with local, state and federal regulations.

- Subtask 11.7 – Project Site Cleanup/De-Mobilization

This task includes the project site and construction equipment and material lay-down and staging area clean-up.

(e) Environmental Compliance/Mitigation/Enhancement

Task 12 – Environmental Compliance/Mitigation/Enhancement

RCWD already has easements for/or owns the land the pipelines and structures will be constructed on. There will not be any land impacted off site that would require mitigation or protection. Onsite work associated with adherence to the SWPPP during construction is included under Subtask 11.1 – Project

Mobilization/On-Going Duties. Considerations will be made for the nesting birds mentioned in the *Biotic Evaluation, RCWD Pipeline, Gateway Village*, prepared by Live Oak Associates, Inc. dated February 6, 2007.

The pipeline location is in current agricultural properties which will not require mitigation after construction since the project impacts on landowners are beneficial, not detrimental.

Deliverables: Since there is no work proposed in this task, there will be no deliverables.

(f) Construction Administration

Task 13 – Construction Administration

■ Subtask 13.1 – Construction Administration

This task will include the project construction administration related work. Specific tasks will include meetings, conference calls, supplier/contractor requests and invoicing, engineering consultant management, and overall project coordination. This task also includes time for submittal review and invoicing review by RCWD staff. This task includes all permit completion documents, annual reporting and final project reporting for the SWPPP.

Deliverable: Preparation of project reimbursement requests and invoices.

■ Subtask 13.2 – Construction Observation and Inspection

This task includes construction administration and observation efforts. RCWD will do this task or hire a construction management sub-consultant to perform construction observation duties.

RCWD will provide a construction inspector to monitor construction of the turnout structures, main pipeline, laterals, and pump station connections. The consultant will make periodic visits to the project site during construction. Other roles of the engineering consultant will include:

- Attend project kickoff meetings
- Attend weekly meetings with RCWD staff and contractors
- Review submittals
- Process monthly payment requests
- Review contract change orders requests.

Deliverables: Daily construction observation and reporting; Meeting minutes; Review of submittals; Contractor progress payment approval and change order review.

■ Subtask 13.3 – Record Drawings.

Upon completion of construction, the design drawings will be modified to reflect construction conditions using information provided by the contractor. The drawings will be signed by a professional engineer.

Deliverables: Record construction drawings.

(g) Other Costs

Task 14 – Other Costs

- **Subtask 14.1 - Legal fees**

Legal counsel activities for this project will include assistance with contracts, negotiations, and permitting.

Deliverables: Invoices from Legal Counsel to RCWD. Finalized contracts and recorded documents.

- **Subtask 14.2 – Stormwater Pollution Prevention Plan (SWPPP) annual fees**

All annual fees associated with the Project's SWRCB Construction General Permit will be billed under this phase. The initial SWPPP application fee will be included under Task 9 – Permitting with the initial SWPPP preparation and permit submittal to the SWRCB.

Deliverables: Invoices from SWRCB for annual fees.

- **Subtask 14.3 – RCWD monitoring and assessment reporting during construction & initial water diversion**

This task includes the work performed during construction and facility testing to survey the environmental monitoring aspects of the project and to prepare the required reports if necessary. The reporting required by DWR on the monitoring and testing of the diversion structure will also be included.

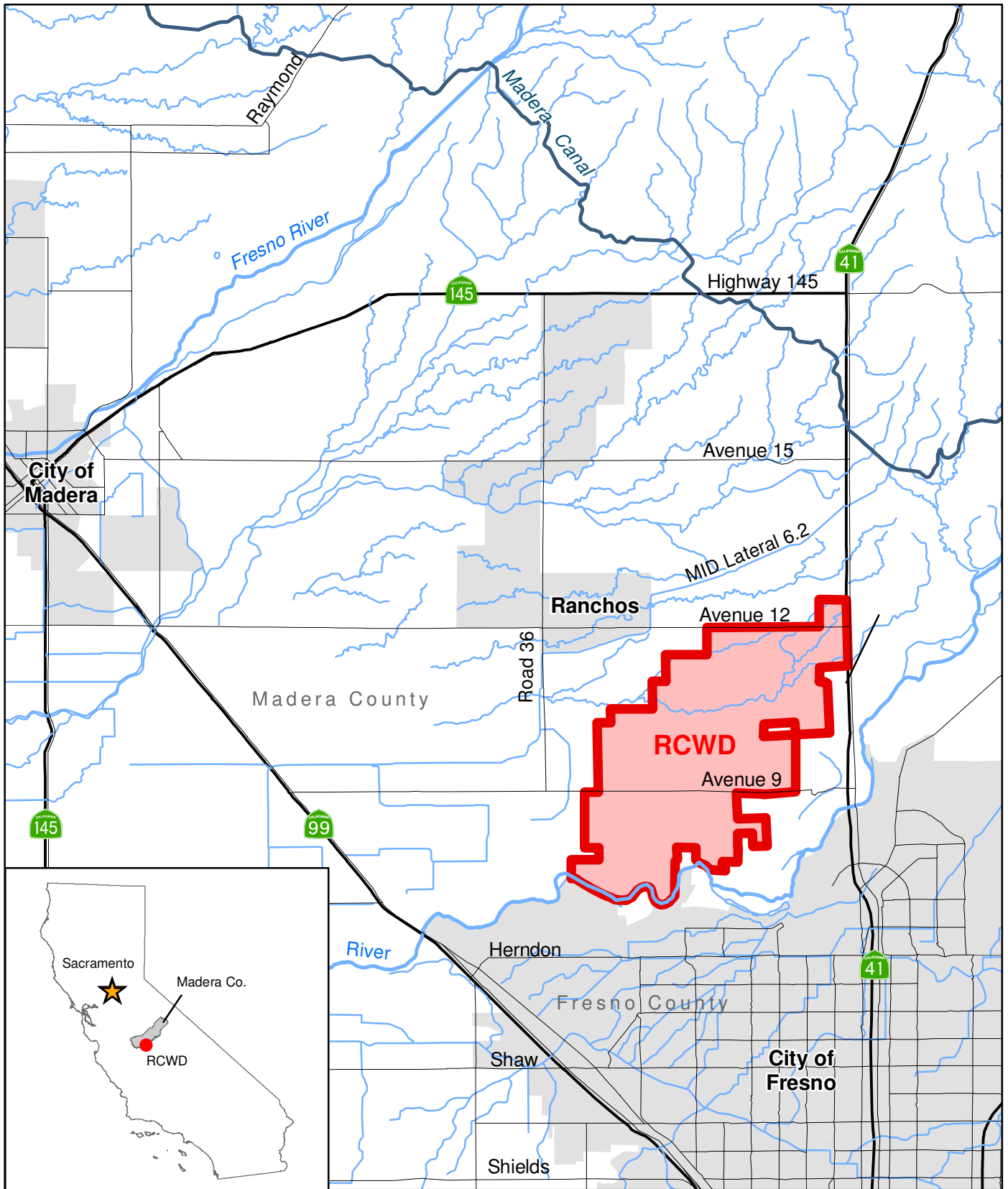
Deliverables: Monitoring data sheets and corresponding reports.

(h) Construction/Implementation Contingency

The contingency amount used for the RCWD "In-Lieu" Groundwater Recharge Project is 15%. The contingency accounts for neglected items and uncertainties in the design, material quantities, and unit prices. A value of 15% was selected due to the current level of planning and design efforts, which are mostly complete.

All Project costs will be tracked and invoiced according to the main project tasks and not according to subtask.

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An Employee Owned Company



- Waterway
- Madera Canal
- Major River
- Root Creek Water District
- City/Town

Root Creek Water District Vicinity Map

Attachment 3.1
**Proposition 84 Integrated Regional
Water Management Grant Application**

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T 21EMillerton
LakeR 10S
R 11S

Friant Dam

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37°0'0"N

Bonadelle
RanchosMadera
CanalFriant
CanalMadera
Ranchos

Avenue 12

MID Lateral 6.2

Road 40

Avenue 10

Joaquin
River




41

R 11S
R 12S

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PROVOST & PRITCHARD
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Tel(559) 326.1100

-  Pipeline Alignment
-  Project Area
-  Root Creek Water District

**Root Creek In-Lieu
Groundwater Recharge Project Map****Attachment 3.1
Proposition 84 Integrated Regional
Water Management Grant Application**

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Attachment 3.1, Project E – Sierra National Forest Fuel Reduction

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Attachment 3.1 – Project E – Sierra National Forest Fuels Reduction

I. Project Introduction

A. Brief Description of Project and Implementing Agencies:

Forested lands account for nearly 66% of current fresh water supplies across the United States and in western states (Brown et al. 2008). In Madera County, nearly 40% of the foothill/mountain area is forested land managed by the Sierra National Forest (SNF). The impact of changing forest conditions on the nation's water supply (both quantity and quality) was recently investigated by a team of scientists, land managers, and policy makers from the US and Canada, culminating in a 2008 National Research Council (NRC) report (NRC 2008). Among the major findings of this report were:

- Forests cover about one-third of the nation's land area, and although they have roles in timber production, habitat, recreation and wilderness, their most important output may be water.
- Forests provide natural filtration and storage systems that process nearly two-thirds of the water supply in the U.S.
- Demand for water continues to rise due to population growth, while forest acreage is declining and remaining forest lands are threatened by disease epidemics, fire and global climate change.
- Forest vegetation and soils, if healthy and intact, can benefit human water supplies by controlling water yield, peak flows, low flows, sediment levels, water chemistry and quality.

These findings are mirrored by those of the California Natural Resources Agency, Department of Water Resources, who in their 2009 update to the California Water Plan (CA-DWR 2009, Table 21-1), listed the following watershed product, goods, and services:

- Water purification/waste treatment – Well managed watersheds produce clean, cool water generally useful for a broad range of beneficial uses. Virtually all fresh water in California originates as precipitation that is intercepted, captured, routed, and released from watersheds in California and the Colorado River Basin.
- Flood Mitigation – Healthy watersheds with adequate distributed wetlands and functional floodplains moderate the volume and timing of surface runoff reducing flood damage.
- Drought mitigation/flow attenuation – A healthy watershed works like a sponge to store and release water to both streams and groundwater. In California, healthy watersheds increase residence time of water, and tend to store and release water longer into the dry season.

Past management of SNF lands has left foothill and mountain watersheds in a hazardous condition. Intensive logging activities and fire suppression since the early 1900's has resulted in forest stands that are severely overstocked (too high of a tree density) and contain heavy loading of ground and ladder fuels (USDA-FS 2005a and 2005b). In addition, planted even-aged stand regeneration (e.g. plantations) was used to replace harvested trees. Many of these plantations are overgrown to the point where they have become wildfire hazards and do not provide habitat for important species such as the Pacific Fisher, Spotted Owl, and Great Grey Owl. These unhealthy conditions leave the forest highly susceptible to disease, insect attack, wildfire, and drought. Lead by science and public policy, the SNF management practices now strive to restore these lands to an uneven-aged and fire adapted ecosystem that will be more resilient to disturbances and provide habitat for old growth species.

This project will use mechanical and hand thinning, followed by slash disposal by piling and burning, to reduce fuel loads and restore these areas to a more resilient state. This work will have multiple watershed benefits. By removing excessive fuels, fire will be able to move through these stands with less intensity resulting in reduced tree mortality and ground charring. These low intensity beneficial fires remove natural fuels from annual needle cast or leaf litter, restore nutrients to the soils, and produce small natural openings that allow for vegetative undergrowth and microclimates resulting in increased forest health, diversity and habitat (Apigian et al. 2006, Chen et al. 1999, Hessburg et al. 2007, Miller and Urban 1999, Moghaddas and Stephens 2007, and North et al. 2009). Most importantly, this project will reduce the probability of large high-intensity wildfires that can have a devastating impact on water resources and wildlife habitat (both aquatic and terrestrial). These are fires that burn with such high intensity that they can leave a watershed devoid of vegetation and ground cover resulting in increased surface runoff and erosion, increased sedimentation into aquatic habitat and reservoirs, and reduced hydrologic and biologic functions of soils.

B. Project Goals, Objectives and Deliverables:

Goals: The overall project goals are

- Reduce the likelihood of high severity wildfires which would remove ground cover that protects soils from excessive erosion and damage the soils ability to filter and retain water
- Minimize the probability of flood events and debris flows occurring after high severity wildfires
- Increase overall forest health and resiliency to disturbances, thus preserving and restoring habitat, ecosystems, and hydrologic functions.

Objectives: Specific objectives include:

- Complete fuel reduction activities (mastication, hand thinning, piling and burning) on 3,550 acres strategically selected in the Wildland-Urban Interface (WUI) to decrease the intensity and rate of spread of wildfire in watersheds that impact the Madera Region water supplies.

- Increase stand vigor, resistance to disease, and forest resiliency on 3,550 acres thus preserving habitat values
- Implement Best Management Practices (BMPs) and BMP Evaluation Program (BMPEP) monitoring to protect soil and water resources during project implementation.

Deliverables: The proposed project will result in the following deliverables:

- Reduced levels of ground and surface fuels, resulting in low to moderate burn conditions as measured using the Intermountain Fire Science Laboratory (IFSL) Thirteen Standard Fuel Models (Andersen 1982).
- Reduced ladder and crown fuels as measured using basal area and crown density measures.
- All environmental reports needed for compliance with CEQA and NEPA
- Periodic (quarterly or annual) and final reports detailing funds spent, acres treated, and fuel model reductions

C. Purpose and Need:

The project areas lie within the Fresno and San Joaquin watersheds, where during the period before significant Euro-American influence, natural fires occurred frequently and were low intensity with return intervals ranging from 5 to 10 years (USDA-FS1995 and 2005a). During the past century, fire history maps indicate that over 170 fires have occurred in the Madera County portion of the SNF. Of these, 38 consumed over 1,000 acres of brush, hardwood, and forest. Although there have been few large fires on the SNF in recent times, the fuel conditions that exist are similar to those on the Sequoia and Stanislaus National Forests which have had several recent large wildfires, most notably the McNally fire on the Sequoia in 2002 which burned over 150,000 acres. The most recent large fire on the SNF was the North Fork Fire in 2001. This fire burned over 4,000 acres before being contained by firefighting efforts along a fuelbreak constructed in proximity to forest road 7S094B. Without the ability to safely fight fire along a reduced fuel line, this fire would likely have burned all the way up to Whiskey Ridge, potentially consuming an additional 5,000 acres (Tolmie, 2010). With similar topography, climate, and vegetation as the Sequoia and Stanislaus, the fact that large fires have not recently burned through the project area makes it likely that future fires could be even more destructive (SNF 2010).

Flood Hazard Reduction

High severity wildfires can leave a watershed completely devoid of vegetation and ground cover. Surface soils are then exposed to the direct impact of rain drops which break up fine particles and clog micropores (surface sealing) increasing surface runoff. High surface temperatures during a fire can also cause physical, chemical, and biological changes to soils that reduce infiltration and make them more susceptible to erosion. Increased soil water repellency due to fire has been documented in a wide variety of climates and soil types (see Cerda and Robichaud, 2009, and references therein). In the most severe cases, high temperatures will destroy soil structure and aggregation leaving a fine powdery surface that is easily eroded.

Rainfall that is normally used in transpiration by vegetation becomes available for runoff. The combined affect is a rapid concentration of runoff with very high sediment loads, increasing the probability and magnitude of flooding and potentially resulting in debris flows. A modeling study of the Mission Creek watershed in Santa Barbara showed that flood discharges equivalent to the FEMA 100-year flood were four to twenty times more likely after a wildfire.

Post fire debris flows are common in mountainous environments and can occur in response to short duration, low-frequency rainfall events (Cannon et al. 2008). Cannon and Gartner (2005) and Santi et al. (2008) have shown that most post-fire debris flows result from intense runoff and rilling that delivers large amounts of sediment and water to stream channel. The stream channels themselves then experience intense bed and bank erosions as in-channel sediment is remobilized and transported downstream in a highly destructive pulse of water, sediment, and debris. This is in contrast to slide-initiated flows that begin when a saturated hillslope experiences an abrupt failure resulting in large amounts of debris being delivered to the channel (infiltration triggered). Post-fire flooding and debris flows can plug culverts, damage bridges and levees, and silt-up reservoirs (Cannon et al., 2007). According to the Durango Herald, Denver Water is still spending millions of dollars on reservoir dredging and watershed restoration from the Haymen Fire of 2002 (Abernethy, 2010).

Water Supply

Forest Service vegetation management projects are expected to have minimal direct impact on water yield. In addition to fuel reduction, another goal of these projects is to restore ecological function and move the landscape toward old growth characteristics. Treatments remove water-competing vegetation allowing residual vegetation to respond with increased vigor. In the long term, these healthier ecosystems maintain a balanced hydrologic regime in which infiltration, evapotranspiration, and runoff provide for the magnitude and timing of stream flows that are beneficial for aquatic ecosystems and downstream water users.

In the event of uncharacteristic high-intensity wildfire, surface sealing, increased water repellency, and reductions in soil organic matter result in reduced infiltration; the loss of vegetative cover reduces transpiration, and the balance between infiltration, evapotranspiration, and runoff is shifted towards increased runoff. However, little is known on the effect on deep percolation which is the primary driver of the timing and magnitude of baseflow.

Water Quality

The Water Quality Control Plan for The Sacramento River Basin and The San Joaquin River Basin (Basin Plan) identify water quality objectives for the project area. The water quality indicators specifically identified in the Basin Plan are Bacteria, Biostimulatory Substances, Chemical Constituents, Color, Dissolved Oxygen (DO), Floating Material, Mercury, Methylmercury, Oil and Grease, pH, Pesticides, Radioactivity, salinity, sediment, settleable material, suspended materials, taste and odor, temperature, toxicity, and turbidity. Of these indicators, sediment, DO, temperature, and turbidity could be affected by the proposed project or the occurrence of high intensity wildfire. These four indicators are also very important to aquatic organisms.

Excessive fine sediments in rivers can destroy spawning habitat, smother eggs, fill in foraging pools, and result in an overall loss of habitat. Loss of canopy cover by fire can increase water temperatures and decreases DO. Temperature effects can last for decades until enough canopy cover is reestablished to provide the necessary shading (see attachment 3.5.1). USFS Best Management Practices (BMPs) are used to reduce the effect of thinning and burning on these pollutants to levels that are within background variability. However, high intensity wildfire has the potential to increase erosion and sediment delivery, turbidity, and temperature; reducing habitat and negatively affecting aquatic organisms.

The Madera IRWMP identifies Microbiological Contaminants (i.e. Giardia, Cryptosporidium, and Legionella) and disinfection byproducts (DBPs) as the major contaminants of concern for the San Joaquin River in the foothill/mountain area. DBPs are related to levels of Total Organic Carbon (TOC) in the raw water prior to treatment. For the Fresno River, the major concern reported was massive algae blooms in Hensley Lake (located approximately 35 miles downstream of the project). Algae blooms are of a concern due to reduced desirability of water related activities and health hazards associated with contact recreation, as well as potentially lethal effects on other aquatic life. Algae blooms can result from excessive nutrients (nitrogen and phosphorous) delivered from the watershed in solution and attached to sediments. The *Fresno River Nutrient Reduction Plan* concluded that these algae blooms were a result of in-lake processes and not from excessive nutrients from the Fresno River. Through increased erosion and introduction of ash during the first flush of the watershed after a fire, nutrient levels in the Fresno River could be expected to increase, possibly exacerbating the algae problem although how long these effects would last and how they would affect in-lake processes is not known.

Ecosystem Restoration

SNF plantations were created by clear-cutting and planting trees at high density. The high density of planting was performed so that natural seedling mortality and future thinning would result in stand densities of mature trees that are optimal for the site conditions. These plantations are young even-aged stands with little structural heterogeneity. This type of management was efficient and economical during a time when timber production drove the management of these lands. The 2004 SNFPM ROD directs the Sierra Nevada forests (including the Sierra National Forest) to move these plantations towards old forest characteristics:

“Where young plantations (generally Pacific Southwest Region size classes 0x, 1x, 2x) are included within area treatments, apply the necessary silvicultural and fuels treatments to: (1) accelerate the development of key habitat and old forest characteristics, (2) increase stand heterogeneity, (3) promote hardwoods, and (4) reduce risk of loss to wildland fire” (USDA-FS, 2004, pg 49).

Forest thinning and prescribed underburning create greater forest heterogeneity by partially opening the forest overstory canopy, in portions of the forest, to allow greater sunlight penetration to the forest floor. This in-turn promotes greater tree species ages as well as promotes greater herbaceous and shrub growth and age classes particularly through the first

10-20 years following treatments. This increased diversity of micro-site niches is essential for many small mammals and bird species that rely on habitats with greater sunlight penetration, and those species in-turn may provide forage for larger species, such a Pacific fisher, marten, spotted owls, and goshawks. A forest with a high degree of heterogeneity provides diversity of micro-site conditions needed by a diversity of wildlife for forage and cover.

Consistency with Basin Plan

A Memorandum of Understanding (MOU) between the State Water Quality Control Board and the Forest Service designated the Forest Service as the Water Quality Management Agency on National Forest System Lands, and establishes a system for implementing Best Management Practices (BMPs) and the Best Management Practices Evaluation Program (BMPEP) as the mechanism for meeting water quality requirements. Water quality in the project area is managed under the Basin Plan. This plan designates the beneficial uses to be protected, water quality objectives, and an implementation program for achieving objectives. The designated beneficial uses in the project area are shown in Table 1. By implementing BMPs and BMPEP this project is in conformance with the Basin Plan.

Table 1. Beneficial uses of Fresno and San Joaquin Rivers within the project area.

Beneficial Use		Fresno	San Joaquin
Municipal	Municipal and Domestic Water	X	X
Agriculture	Irrigation	X	X
	Stock Watering	X	X
Industry	Process		
	Service Supply		
	Power		X
Recreation 1	Contact	X	X
	Canoeing and Rafting		X
Recreation 2	Other Non-Contact	X	X
Freshwater Habitat	Warm	X	X
	Cold	X	X
Wild	Wildlife Habitat	X	X

II. Project Readiness

All of the project areas are in varying stages of readiness (Table 2). The Cedar Valley area was covered under an Environmental Assessment (EA), whereas the Nehouse, Foster, Walker Mine/Topping, Double Gate, and Grave/Yard areas were covered under a Categorical Exclusion (CE). Areas of thinning that have been started and require additional funding to complete are in the Cedar Valley, Nehouse, Foster, Walker Mine/Topping activity areas. Thinning for which NEPA has been completed but implementation has not started are in the Double Gate, Grave/Yard, and Swortzel activity areas. Prior to any further work being done in these areas, CEQA documentation will need to be completed. It is believed that CEQA documentation could be completed for the areas covered under CEs or EAs within 2-3 months as these should be either Negative Declarations or fall under a categorical exemption. This documentation could be developed prior to the award date. CEQA documentation for the Grey's Mountain and Kelty projects will be developed concurrently with NEPA as specified in the schedule.

Table 2. Project readiness by activity area.

Project Area	NEPA complete? (level)	Expected CEQA level (date)	Previously started?	Earliest implementation under award	Expected Completion
Cedar Valley	Y (EA)	ND (2011)	Y	2011	2014
Double Gate	Y (CE)	CE (2011)	N	2012	2013
Foster	Y (CE)	CE (2011)	Y	2012	2013
Grave/Yard	Y (CE)	CE (2011)	N	2013	2014
Grey's Mtn	N (EA)	ND (2012)	N	2013	2014
Kelty	N (EA)	ND (2013)	N	2014	2014
Nehouse	Y (CE)	CE (2011)	Y	2011	2012
Swortzel	Y (CE)	CE (2011)	N	2012	2014
Walker Mine/Topping	Y (CE)	CE (2011)	Y	2011	2012

USFS contracting requirements, combined with environmental protection limitations for thinning and burning, will prevent significant work from being implemented in the first year of the award. It is possible that 140 acres of mastication, 100 acres of hand thinning, and 100 acres of slash disposal could be completed within 5 months of the award date.

All work will be conducted on Forest Service lands, therefore no permits or rights-of-way need to be obtained.

III. Data and Studies –

All activities on SNF lands are directed by the Sierra National Forest Land and Resource Management Plan (see Attachment 3.5, page 21) which was amended in 2004 by the Sierra Nevada Forest Plan Amendment Record of Decision (see Attachment 3.5, page 161). These documents were vetted through the NEPA process to provide desired conditions and standards and guidelines based on best available science for the forest.

Two landscape-level studies were conducted in the project area. The Willow Creek Landscape Analysis (see Attachment 3.5, page 235) and the Fresno River Landscape Analysis (see Attachment 3.5, page 245) provide more detailed information for these areas on the historic reference variability, existing conditions, and desired conditions. These reports show that existing fuel conditions in the project areas are well beyond their reference variability and desired conditions with high fuels loads and rapid fire spread. For example the Willow Creek analysis concluded that within the project area, the mixed conifer fuel loading is currently 50 tons/acre. This is compared with a reference variability of 11-21 tons/acre and a desired condition of 21 tons/acre. The Fresno River analysis recommended Strategically Placed Area Treatments (SPLATS) for fuel reduction treatments. The Double Gate, Grey's Mountain, Kelty, and Cedar Valley areas were all identified as SPLATS

IV. Plans and Specifications

Plans and specifications for vegetation management are developed through the NEPA process by an interdisciplinary team of specialists. The Proposed Action and management requirements (design features) for the Cedar Valley project are provided as an example in Attachment 3.5, page 3.

Examples of mastication and hand thinning contracts with specifications are also provided in Attachment 3.5, page 385.

V. Project Timing and Phasing:

As discussed above, this project consists of several activity areas that are designated based on their NEPA documentation project title. Although on a landscape level, the maximum benefits of the project would be realized through the implementation and completion of fuel reduction in all project areas, each one can be implemented without the other and any reduction in fuels within the watersheds would provide ecosystem restoration and protection. Within each project area, some amount of phasing does occur (e.g. piling and burning on any given acre cannot be done until the thinning is complete), but in general the implementation of the projects are independent of each other.

Three of the project areas (Cedar Valley, Grey's Mountain, and Kelty) are multi-phased projects that include both commercial and non-commercial thinning, fuels reductions, plantation thinning, and ecosystem restoration activities. Within each of these areas there are units that are just fuel reduction units and areas that are both commercial thin and fuel reduction units. Within the fuels-only units, thinning and fuel reduction will be conducted regardless of the sale of timber. In the combined units, it is preferable to have the commercial thinning done first and then follow up with fuels reduction, including any remaining slash from the commercial operation. However, non-commercial thinning could progress even in the absence of the timber sale since most ladder fuels of concern are not of commercial value. Funds requested or used for matching do not include those associated with the commercial thinning aspects of the project. The other project areas are strictly plantation thinning and fuel reduction areas with no phasing or dependencies on other treatments.

VI. Attachments

- 3.5.1 – Cedar Valley Environmental Assessment
- 3.5.2 – Madera Regional Watershed Management Group Meeting Minutes
- 3.5.3 – Sierra National Forest Land and Resource Management Plan
- 3.5.4 – 2004 Sierra Nevada Forest Plan Amendment Record of Decision
- 3.5.5 – Willow Creek Landscape Analysis, Appendix K
- 3.5.6 – Fresno River Landscape Analysis
- 3.5.7 – Mastication contracts

C. Task List

1. General Description of Work

As part of an aggressive and multi-benefit program, the USFS has identified several project activity areas that are in need of treatment (Table 2) to reduce fuels and move areas towards old-growth characteristics. These project areas all contribute to the goal of increasing forest health and the objective of reducing fuels in the WUI area, reducing post-fire flood hazards and benefitting the watershed. Several of these areas have already received some treatment but are still in need of further work to maximize these benefits. Other areas have already been analyzed under NEPA but have not had any work done, and two areas (Grey's Mountain and Kelty) are still in need of NEPA/CEQA analysis. By including several project areas in this proposal under varying stages of readiness, the USFS can most efficiently complete the work needed to meet the goals and objectives. CEQA requirements can be completed fairly quickly and treatments completed in some areas while the NEPA/CEQA is completed for the other areas.

Thinning treatments include both mastication and hand thinning. Mastication is the shredding of small (< 8 inches) diameter brush and trees using a rotating cutting edge, typically mounted on the arm of an excavator. The machine travels on the bed of material that was masticated in front of it, thereby reducing the potential for soil disturbance and compaction. Stands are thinned to a specified spacing (see section IV) that will allow the remaining vegetation to grow with less competition, while at the same time reducing stand density and fuel continuity. "Leave trees" are prescribed so that the remaining stand has diversity and resiliency. Mastication is typically done on slopes less than 50%.

Hand thinning utilizes chain saws to fell < 10 inch diameter trees and reduce ladder fuels within the stand. The felled trees are bucked and the wood is piled by hand or machine for burning at a later time when weather conditions are appropriate. Some felled trees are left in place to provide large wood structures on the forest floor for habitat and soil nutrient cycling. In both cases, not all small trees are removed since leaving some small trees increases the diversity of the stand.

Tractor piling is generally done on ground with less than 35% slope. Steeper areas need to be done by hand.

It is expected that implementation in any project area will be conducted as color-coded on the project schedule (attachment 5.1, page 27), however actual on-the-ground acres to be treated at any time is determined during unit layout as part of the contract/project administration (Task 13). This is necessary to provide flexibility for the Forest Service and their contractors, and is essential to getting the most acres treated in a given season because of environmental and regulatory constraints (e.g. Limited Operating Periods for wildlife, weather and ground conditions, soil and water protection measures, availability of equipment and personnel).

Forest Service BMPEP monitoring is done to endure that BMPs were implemented and effective. Problems found in the implementation or effectiveness is then used to modify BMPs and management prescriptions for future projects.

2. Task Descriptions: Project E - Sierra National Forest Fuels Reduction Project

(a): Direct Project Administration Costs

Task 1: Administration

1.1 – Preparation of invoices to Applicant

Deliverable: Submission of invoices to Applicant

Task 2: Labor Compliance Program

2.1 – Submission of the Forest Service Labor Compliance program to DWR

Deliverable: Submission of Labor Compliance Program

Task 3: Reporting

3.1 Preparation and submission of quarterly project reports to Applicant

3.2 Preparation and submission of annual project reports to Applicant

3.3 Preparation and submission of final project report to Applicant

3.4 Quarterly meetings of Project Proponent and Applicant

Deliverable: Submission of quarterly, annual and final reports as specified in the Grant Agreement.

Task 4: Development of Financing – not applicable

(b) Land Purchase/Easement

Task 5 – Land Purchase/Easement – not applicable, all activities will take place on Forest Service land

(c) Planning/Design/Engineering/Environmental Documentation

Task 6: Assessment and Evaluation – all assessment and evaluation activities are conducted as part of the project design, contract preparation, and NEPA/CEQA tasks. Due to the nature of the projects, as developed by the USFS, the task, budget, and schedule of this is inseparable from these other tasks (see budget notes).

Task 7: Final Design

7.1 Develop Proposed Action and perform scoping for Grey's Mountain and Kelty. - The design of these projects is developed by an interdisciplinary team of specialists during the development of the Purpose and Need, Proposed Action, and Scoping documents for NEPA. This requires a combination of office and field work, including data analysis, meetings, field investigations of existing conditions as they relate to silviculture, fuels, wildlife, hydrology, soils, aquatics, archeology/heritage, and botany.

Deliverables: For projects that require an EA or EIS, the deliverable will be the scoping documents and public notices, which include the Propose Action. Copies of these would be provided to the Applicant as well as all interested parties.

Task 8: Environmental Documentation

8.1 Develop CEQA documents for projects already covered in NEPA - For those projects that have already been through the NEPA process, appropriate CEQA documents will be developed prior to any work being implemented. As a federal agency, the USFS cannot be the Lead Agency for purposes of CEQA. However, the USFS will provide all necessary documents and analyses to the Applicant for CEQA compliance.

8.2 Respond to scoping comments, develop specialist reports, management requirements and NEPA/CEQA documentation for Grey's Mountain and Kelty - NEPA/CEQA documentation and analysis will be developed concurrently for the Grey's Mountain and Kelty areas. This requires a combination of office and field work, including data analysis, meetings, further field investigations of potential impacts as they relate to wildlife, hydrology, soils, aquatics, archeology/heritage, and botany. These documents are expected to be EAs or EISs for NEPA, and Negative Declarations (NDs) or Environmental Impact Reports (EIRs) for CEQA. As a federal agency, the USFS cannot be the Lead Agency for purposes of CEQA. However, the USFS will provide all necessary documents and analyses to the Applicant for CEQA compliance.

Deliverables: Draft and Final Specialist Reports, EAs, EISs, and environmental analysis and documentation for CEQA compliance.

Task 9: Permitting – not applicable, all activities are on Forest Service lands and not subject to permitting requirements

(d) Implementation

Task 10: Implementation Contracting – Implementation of this project will involve contracting for mastication work. Hand thinning, piling, and burning will be done in-house by Forest Service personnel.

10.1 Prepare and advertise contracts – this includes field reconnaissance and layout of units to be worked, prepare stand cards and maps, meeting with potential bidders, evaluating bids, and entering contract information into corporate database

10.2 Award contracts for mastication

Deliverables: Bid advertising, meetings, and contract award.

Task 11: Implementation – Implementation will involve mastication, hand thinning, tractor piling, and burning. It also includes implementation of all applicable BMPs. This includes hand thinning and piling for the Cedar Valley fuelbreak in 2010 which was done by American Recovery and Reinvestment Act (ARRA) funds. The results will be measured in acres treated and acres that were moved from existing fuel model to desired fuel model (see attachment 5.5 ‘project schedule’ for actual acres treated and/or planned each year).

11.1 Masticate Stands

11.2 Hand thin plantations

11.3 Tractor pile slash

11.4 Burn piles

Deliverables: Quarterly and annual reports that document acres treated and fuel models changed.

(e) Environmental Compliance/Mitigation/Enhancement

Task 12: Environmental Compliance/Mitigation/Enhancement –

12.1 – BMPEP monitoring and other monitoring requirements determined through NEPA or CEQA analysis. This task uses the Forest Service Region 5 BMPEP monitoring protocol which monitors both the implementation of BMPs and the effectiveness of BMPs after at least one winter after treatment.

Deliverables: BMPEP evaluation forms

(f) Construction Management/Administration

Task 13: Project Management and Oversight

Project and program management is performed by various USFS personnel, both in the office and in the field. The work leaders are typically the District Fuels Officer or the District Silviculturist, and the crews consist of Assistant Fuels Officers, Culturists, Fuels Technicians, Contracting Officer Representatives (CORs) and Inspectors. Depending on the complexity of the task and the availability of personnel, any of these employees could be responsible for parts or all of the following sub-tasks. As discussed in the budget notes, the complexity and time required for these sub-tasks are scaled with the size of the project making it more efficient and accurate to track and report them in terms of the acres treated.

13.1 *Mastication Contract Management*– meet with contractors and USFS Contracting Officer (CO) as necessary, flag property lines and archeological sites for avoidance, inspect work, complete daily diaries and Federal Acquisition

Regulations (FAR) requirements, record work in Forest Service Activity Tracking System (FACTS), and enter payments into the Integrated Acquisition System (IAS).

13.2 Mastication Program Management – general supervision and human resource management of USFS personnel involved with the mastication project

13.3 Hand Thinning Project Management – meet with crew, unit reconnaissance, designate units to be worked (based on available labor, weather, etc), prepare and update stand cards, review environmental documentation and consult with specialists if needed, flag property lines and archeological sites, enter information into FACTS

13.4 Hand Thinning Program Management – general supervision and human resource management of USFS personnel on the thinning crew (typically a 9-person crew).

13.5 Tractor Piling Project Management – meet with dozer operator, alert adjacent landowners if necessary, inspect work, update stand cards and enter data into FACTS

13.6 Tractor Piling Program Management - general supervision and human resource management of USFS personnel involved with the piling (typically an operator and a swamper).

13.7 Pile Burning Project Management – meet with crew, determine suitability for burning (weather, air quality, fuel moisture), enter data into FACTS

13.8 Pile Burning Program Management - general supervision and human resource management of USFS personnel involved with burning.

Deliverable: Project completed according grant agreements and state and federal requirements.

(g) Other Costs

Supplies, printing, mailing, and legal notice costs for NEPA/CEQA compliance.

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